Imagine a totally portable computer that slips into your briefcase, incorporating an LCD screen, full typewriter keyboard, printer and microcassette, and runs on its own power supply for use anywhere.

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Exceptional quality.

The HX-20. The most complete portable computer available today.

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A computer small enough to fit into a briefcase yet with full size typewriter keyboard, LCD Virtual Screen, printer and microcassette facility actually built in.

Improbable. Until today.

Functions fantastic.

The HX-20 is a real computer, not a gimmicky toy. Or an extension of your calculator. Or just another desk top computer. It is a precision machine with 16k RAM which is optionally expandable to 32k and 32k ROM expandable to 64k, RS-232C and serial interfaces.

The full size ASCII typewriter keyboard and five programmable keys brings ten separate program functions to your fingertips.

The HX-20 can run on its own power supply for over 50 hours which can be easily recharged overnight, and has the ability to retain its memory in RAM even when switched off.

Virtual Screen keeps you in the picture.

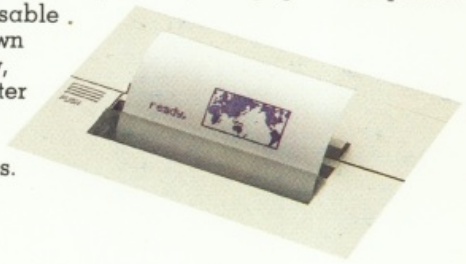
The HX-20's LCD Screen is unique, keeping you in the picture by showing any 20 characters by 4 lines at a time. You can, therefore, carry out word processing or data entry as if you are using a large screen.

Upper and lower case letters, numerals, punctuation marks and graphics are easily read by simply adjusting the viewing angle.

Print out. Built in.

A built-in 24 column dot matrix impact microprinter offers 42 LPM in a crisp, precise 5 x 7 matrix for perfect hard copies on plain paper. Every time.

And there's more. . .Bit addressable graphics allow you to design your own characters for full graphic capability, a cartridge ribbon, full ASCII character set including £ sign and enough international symbols for reproducing most Western languages.



Add-on capability.

Choose from a wide range of peripherals. Barcode readers, audio cassette for loading and saving programs, microcassette and ROM cartridges, and the world famous Epson dot matrix computer printers for quality output . . .to name just a few.

Via acoustic couplers this superb machine can also be linked through the telephone to other computers.

Software and the hard facts.

The HX-20 uses a full extended version of Microsoft BASIC, with a 24 hour clock, date and alarm, string functions, and music generation. The interface options (with RS-232C and serial interfaces as standard) include a standard cassette, a ROM cartridge, plus a system bus that allows you to expand the RAM and ROM capabilities.

Portability for Programability. Anywhere.

The HX-20 is light and totally portable for writing programs and manipulating data – virtually anywhere. (Just four nickel-cadmium batteries and a low power all-CMOS memory gives you a reliable power source during your travels.)

Back at the office you can dump your data or programs onto a cassette or into your main computer system.

Reliability through Research.

A computer coming from Epson has got to be good. After all we have been responsible for high quality precision manufacture since 1961. Just take a look at our impressive track record with the hugely successful Epson dot matrix printers.

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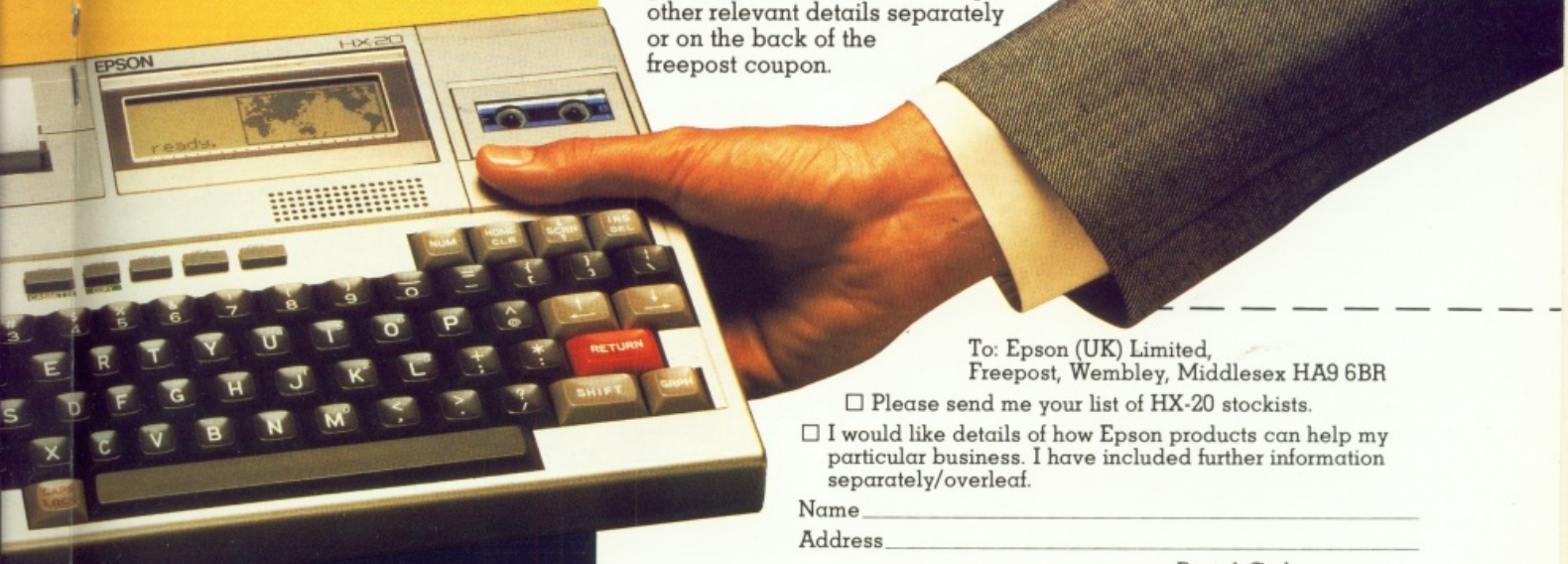
Clip the coupon below and return it to us – Freepost – no stamp required and we'll send you the complete list of HX-20 stockists by return.

If you would also like further details of how the HX-20 can be suited to your particular requirements simply include your area of business and any other relevant details separately or on the back of the freepost coupon.



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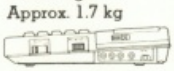
Specifications of HX-20

Dimensions and Ambient Conditions

Dimensions and Weight

1. Dimensions:	290mm wide 215.5mm deep 44mm high
2. Weight:	Approx. 1.7 kg



Ambient Conditions

1. Temperature:	5°C to 35°C (operating) 5°C to 35°C (charging) –5°C to 40°C (data storage) (RAM battery backup) –20°C to 60°C (non-operating)
2. Relative humidity:	10% to 80% (operating, no condensation) 10% to 80% (non-operating, no condensation)
3. Shock resistance:	1 G for 1 ms maximum (operating)
4. Vibration resistance:	0.25G 55 Hz maximum (operating)

Power Supply (Nicd batteries)

1. Voltage:	4.5V to 6.0V (operating) 4.0V to 6.0V (data storage) 4.5V (low voltage detection)
2. Battery capacity:	Approx. 1100 mAH

AC Adaptor

1. Input voltage:	AC 220V/240V ± 10%
2. Power consumption:	8W
3. Insulation resistance:	10megohms between AC power supply and case
4. Insulation strength:	Can withstand 1 kV applied between AC power supply and case for 1 minute or more

Microprinter (M-160)

1. Printing system:	Dot impact (4 printing solenoids)
2. Printing format	
a. Total number of dots:	144 dots maximum/dot line
b. Number of characters per line:	24 maximum (5 x 7 dots; character-to-character space 1 dot) (6 characters/printing solenoid)
3. Printing speed	
a. 1 dot line:	Approx. 150 ms (continuous printing)
b. 5 x 7 dot matrix (interline space 3 dots):	Approx. 0.7 line/s (continuous printing) 42 lines per minute
4. Character size	
a. Dot spacing:	0.33mm horizontal 0.33mm vertical
b. 5 x 7 dot matrix:	1.7mm wide, 2.4mm high
5. Recording paper	
a. Kind:	Plain paper
b. Paper width:	57.5 ± 0.5mm
c. Outside diameter:	50mm or less
d. Thickness:	0.07mm
e. Weight:	52.3 g/m² (45 kg/1000 sheets/1091 sheets x 788mm)
6. Paper feed:	Automatic feed every dot line; with paper release.
7. Inking	
Ribbon cartridge type	
Automatic continuous feed during motor operation	
a. Colour:	Purple/Black
b. Dimensions:	Approx. 91mm wide, 25mm deep, 7mm high
c. Life:	Approx. 10,000 lines
d. Standard:	ERC-09

Liquid Crystal Display

1. Text:	Upper and lower case, numerals, symbols, graphic characters and more; 20 characters per line; 4 lines in total (20 x 4 = 80 characters)
2. Graphic:	120 dots (horizontal) x 32 dots (vertical) = 3840 dots
3. View angle adjustment:	Adjustable with VIEW ANGLE density control

Keyboard

1. Key switches:	Typewriter layout, full size. 68 keys (including 5 function keys and 13 special keys)
2. Others:	Power on switch, VIEW ANGLE density control for LCD, and adjusting circuit built in

RS-232C Interface

1. Connector:	DIN (8-pin) TCS 4480
2. Input and output levels:	RS-232C standard
3. Transfer speed:	110, 150, 300, 600, 1200, 2400, 4800 bps (selectable by operator)

Serial Interface

1. Connector:	DIN (5-pin) TCS 4450
2. Input and output levels:	RS-232C standard
3. Transfer speed:	38, 150, 400, 600, 4800 bps (selectable by operator).

HX-20
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VIC-20 an

WE NEED YOUR HELP!

Starting this month we shall be featuring a Reader Feedback card in the magazine. We'd like to find out more about our readers – your particular needs and preferences. Please help us to produce a better magazine by spending a moment to answer the questions on this card – all information will be treated in strict confidence. The FREEPOST address on the back of this card means you don't need a stamp.

Name .....
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In which of the following categories would you place yourself (tick one):

Beginner/newcomer to computing ☐
About to purchase a Micro ☐
Inexperienced user ☐
Experienced user/enthusiast ☐

How would you classify your main use of computers (or potential use of computers)? (Tick one):

Mainly home computing ☐
Mainly business computing ☐
Both home and business ☐
Scientific/Technical/Educational ☐
Other .....

Please indicate your age bracket and occupation

Age under 18 ☐ 18-30 ☐ 30-50 ☐ 50+ ☐

Occupation .....

VIC 20

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Still unbeatable value at this price with a full size keyboard
Backed by Adda's full one year warranty.

The 64K personal computer that outpaces the rest
Backed by Adda's full one year warranty.

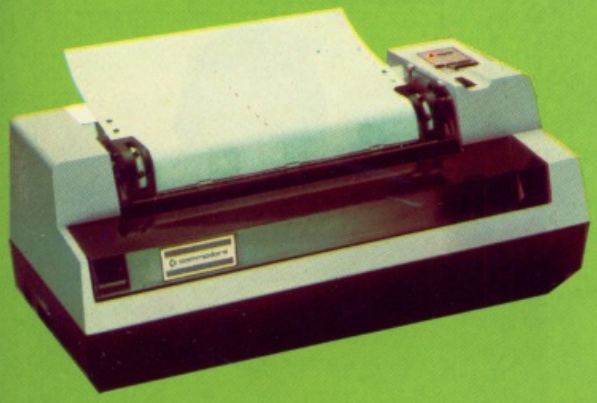
graphics * Sprite graphics on eight levels * Music synthesiser with three voices and nine octave range * 16 colours available simultaneously * 8 bit parallel user port.

PRINTER

£230
inc VAT – carriage free

The VIC Printer – suitable for the Commodore 64 also – will print programs, letters, business data and graphics. It offers high specifications at a competitive price.

Features include: 80 characters per line. Tractor feed dot matrix. 30 characters per second print speed. Full alphanumerics and graphic printing. Double-size character capability. Price includes all cables. Alternative printer **GP100VC** with full-size paper feed **£270.25** inc VAT.



DISK UNIT 1541

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For the VIC-20 and the Commodore 64.
A disk unit transforms your computer into a high-speed system ideal for the more serious programmer or small businessman. It enables you to get the best out of your utility programs.

Features include: 170K bytes capacity. Uses soft-sectored standard 5¼" single density floppy disks. Direct interface to computer. Direct compatibility with Printer. Price includes all cables.

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Description & Classification:
Can easily be recognised by the facthe/she has never been known to purchase a battery. They look perfectly normal, are basically normal and live in perfectly normal homes. EXCEPT they don't have a television! 1990's

coloured plastic) and writting letters by HAND!!! Get this for a laugh... they even play chess with EACH OTHER!! Pitiful, pitiful...

Conservation Advice:
Frankly it's difficult to see how this breed has survived so long. There's no need to slap a preservation order on them. If they're so resolute, they'll survie of their own accord. Poor people...they just don't know what they're missing!

companies turned over to video entertainment in the mid '80s, "live" music became a thing of the past. Nowadays, the star on "Top of the Pops' is a programmers with his box of chips. The classics are digitally encoded by technicians and replayed with total precision down cables to every home. Not a note is out of place and the tuning is clinically perfect. How lucky we are!

Habits:
Although it's illegal, they tend to practice secretly at home. You can still see them occasionally busking on street corners (do give 'em a 10 pound coin or two), or playing at children's parties (the kids think they're highly amusing!).

Conservation Advice:
Along with other CREATIVI INDIVDUALI, it's a bit late now. We should have done something about them in the mid '80s. We may have 'perfect' music in the '90s, but it all seems to sound the same. Real music must have been different and fun!.

ARTISTICUS NON-COMPUTERUS

Description & Classification:
This species is part of a rapidly vanishing group. In the early 1980's they were known under various headings..."graphic artist", "painter", "cartoonist", "design sepcialist" and "layout artist".

Nowadays there are so few of them left that conservation orders alone are responsible for their survival. Some of their work can still be seen behind the electrified fence and 3 metres of 'securo-glass' at the Tate Gallery; all the rest of our cultural heritage was put on video and the originals sold to texas in 1987 to save the UK national software debt.
ARTISTICUS NON-COMPUTERUS can be recognised by the ink stains on the hand. Yes, amazingly they still use things like paper, pens and felt-tips. Along with MUSICA NON-SYNTHESA, both species are part of the endangered classification: CREATIVI INDIVIDUALI. Their survival became in doubt in 1987 when the 'Arts Council' (as it was known) ran out of funds and was replaced by a chip. An operator error subsequently turned the National Theatre into a gigantic DATA storage complex.
(NB: 'Theatre' was a strange form of entertainment using REAL people).

Habits:
Many of them feel resentment since their training and talents are mostly ignored by the video society. When holographic-synthesis replaced stage design, computer graphics did away with creative layouts and paints were considered un-safe for children, lots of people lost their jobs. You can still see some of them scribbling on the silicon side-walks. The artwork may be crude but it isn't surprising when you consider it's actually drawn BY HAND! Some of them eak out a living sketching other human beings. Of course, the result isn't a patch on modern 'photo-grafix' but it can be interesting.

Conservation Advice:
If only we'd thought about it in 1985! Once imagination was replaced by automation, no one was creative enough to remember what 'creative art' was all about.

ESA

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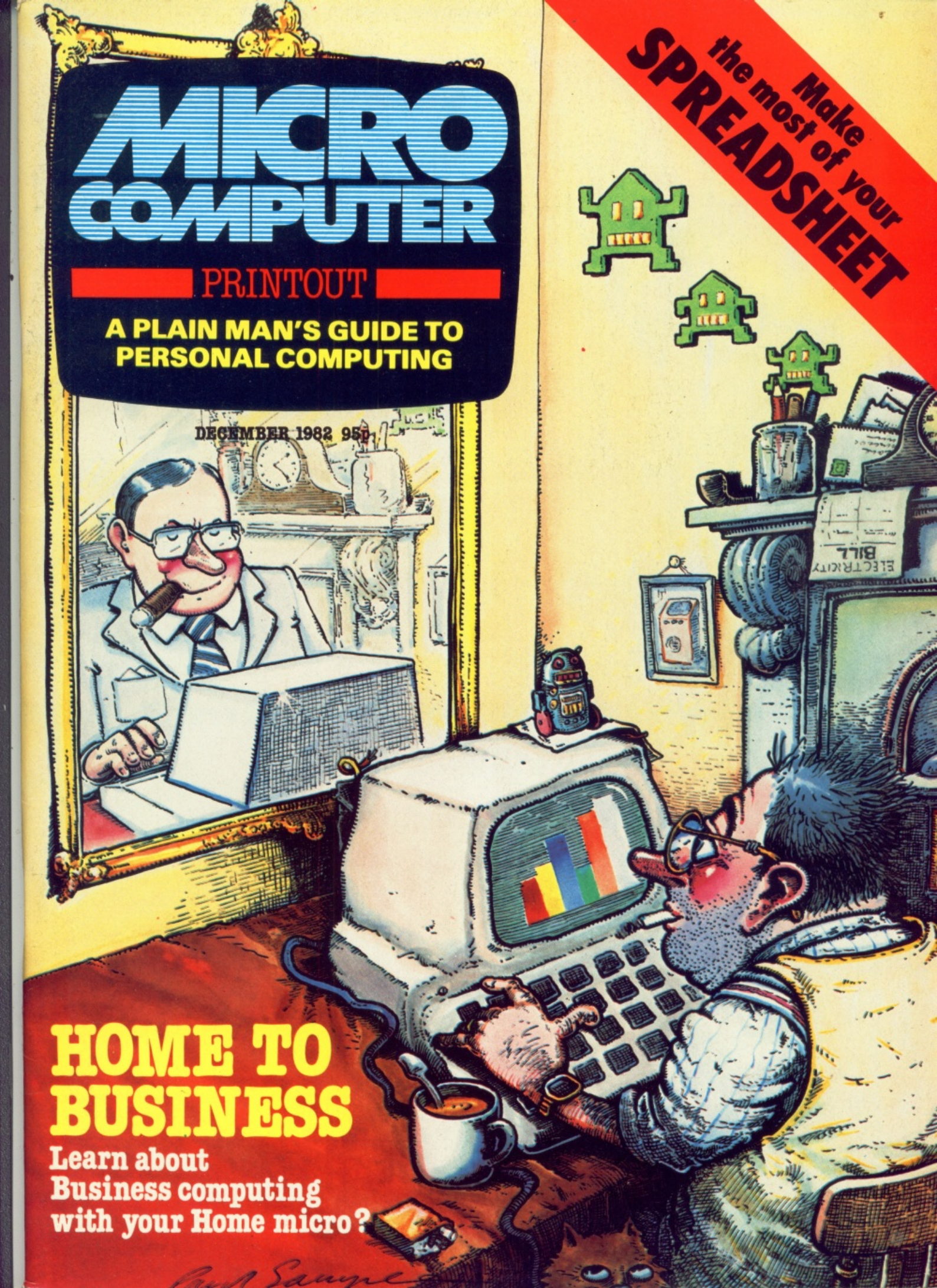

HOME TO BUSINESS

Learn about Business computing with your Home micro?

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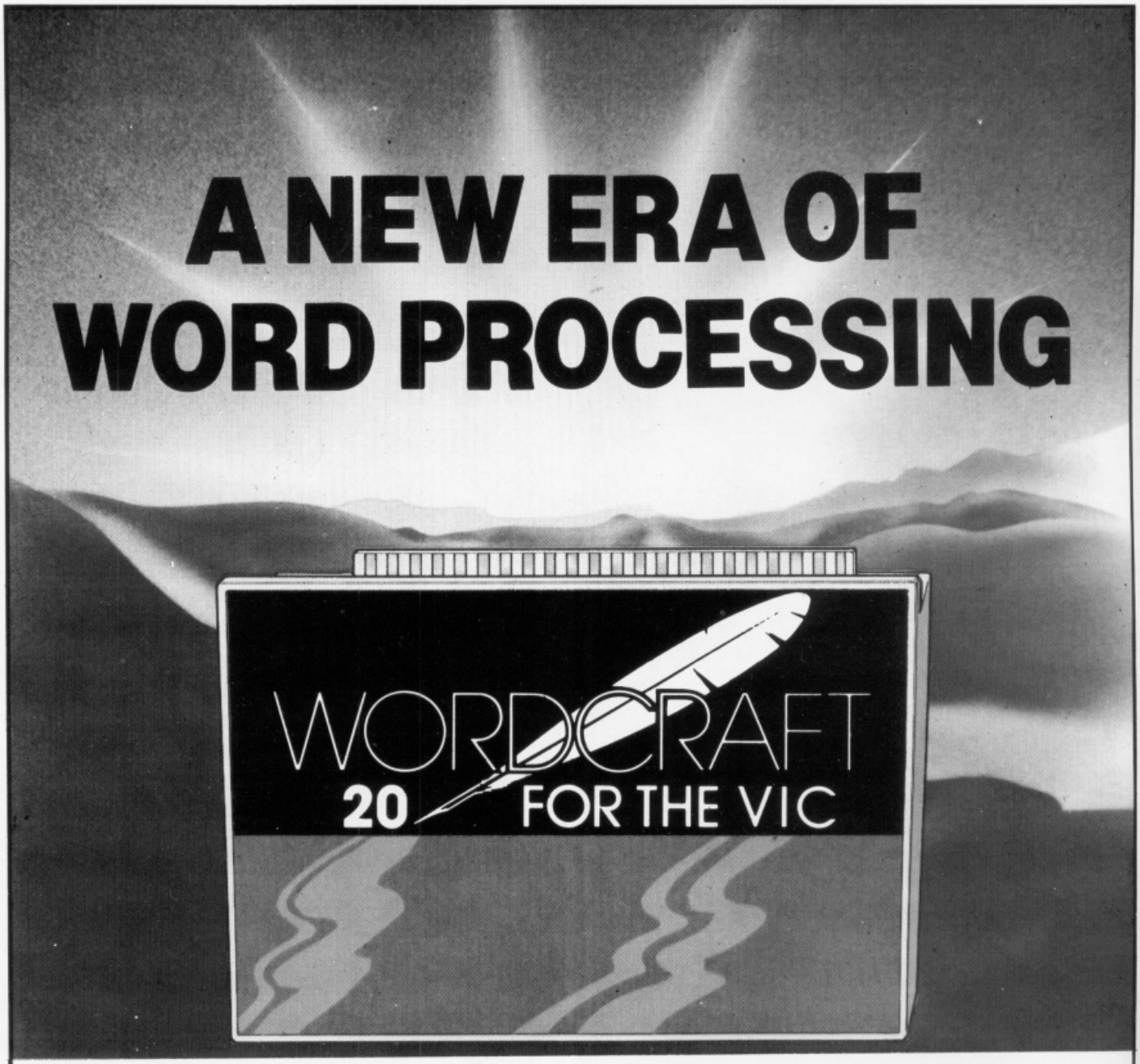

The introduction of Wordcraft 20 for the VIC brings the benefits and advantages of full scale word processing directly to the general public.
Until now only the business world could afford word processing systems but this amazing price breakthrough makes it available to everyone.
Wordcraft 20 comes on a cartridge ready to plug into the back of the VIC. Included in the cartridge is an extra 8K of RAM that is also available for use with other programs – so not only do you get a word processor but you also get a memory expansion thrown in. The system also comes with complete documentation catering both for the inexperienced user and for those already familiar with Wordcraft 80.
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★ Full use of colour and sound.
★ Full compatibility with VIC 1515 printer, parallel printers or RS232C serial printers.
★ Full control over margins, document width, tab stops, decimal tabs, justified output, multiple copies. Complete control of the final output.
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Wordcraft 20. The package that the VIC user has been waiting for. A word processor of proven quality at a low price.
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Wordcraft 20: £125.00 inc. VAT and p&p. Available from all VIC dealers or direct from Audiogenic Ltd. PO Box 88, Reading, Berks. Tel: 0724 586334.
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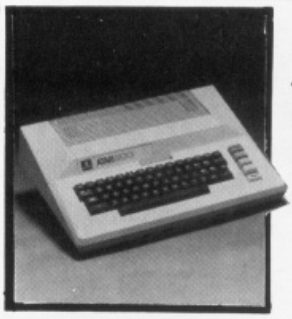

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FRONTLINE

Home to Business

In the beginning there were the three: PET, Apple and Tandy. And they knew no distinction between home and business, for the world of personal computing was a new creation and everything lived in harmony. Then came the voice of the tempter, "Come, there is much fruit to be had in the business sector," and to others, "See, there is a whole home market waiting to be your servant." So new generations were born – and so began the great divide....

And there, if you'll excuse the allegory above, we have it. The microcomputer market is now a dichotomy. From the moment you first make contact with it, whether through books, magazines, advertisements or even the purchase of a machine, you will be herded into one of two pens, and branded accordingly: 'home user' or 'business user'.

The original concept of the personal computer was nothing more or less than 'one man – one machine'. It didn't matter whether you wanted to peruse an adventure game, or process your accounts receivable, the principles of personal computing were the same. The 'great divide' has come about largely because of developments in hardware design. 'Home computers' have become cheaper, more colourful and game-oriented, whilst business systems have moved up market with the advent of 16-bits, larger memories and ergonomic design. This trend is both inevitable and beneficial to the consumer.

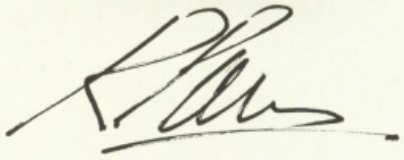
The corollary, however, is that it is becoming increasingly difficult for anyone to learn about business computing by having a computer at home. There are several reasons why this might be desirable. First, might be a desire to learn about computing in the privacy of your own home, rather than face possible embarrassment on a company training course. Second, a desire to get ahead by showing initiative. Third, is the idea of taking up an interesting hobby that might just end up being useful and, er, tax deductable. Finally, in the case of a small trader, the incentive of expanding the hardware to run his business.

In the new series **'Home to Business'** starting this month, we shall be looking at the whole question of "How much can you learn about business computing with a home micro?" We'll be looking in detail at both hardware and software – and new developments such as the exciting Commodore '64 which will help to bridge the gap between home and business computing. This month we kick off with an introduction to the subject followed by an intensive case study on the Atari 800.

At *MicroComputer Printout* we are hoping to reverse a trend and get back to the concept of the *personal computer* whether at use in the home or the business.

P.S.

Next month we shall be having quite a lot of fun – to coincide with the festive season. In *Desert Island Disks*, Terry Hope will be introducing the ten programs he would most like to be stranded with on an island; Humphrey Walwyn will be looking ahead at personal computing in 20 years time, and there might even be some serious stuff if the editorial team can keep sober long enough to write it.



Richard Pawson – Editor

P.P.S.
Please do fill in and return the Reader Feedback Card stapled in this issue. The collated information will be a great help in planning future issues.

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On Atari, VIC 20, Commodore 64 and

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THE NEW COMMODORE 64

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DRAGON 32

The amazing new British computer with a full-travel standard keyboard, a 16-bit microprocessor, 32K RAM fitted (expandable to 64K and later to 256K!!), 9 colours, hi-res graphics and Microsoft extended colour BASIC (the very best BASIC to learn with). It can be used with virtually any ordinary cassette recorder, it has a printer interface (Centronics-type), joysticks are available and it's incredible value for money. **(AF57M) Only £199.50**

THE AMAZING ATARI COMPUTERS

4 Consoles Available:

Atari 400 with 16K RAM (AF36P) £249.95

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Atari 800 with 16K RAM (AF02C) £499.00

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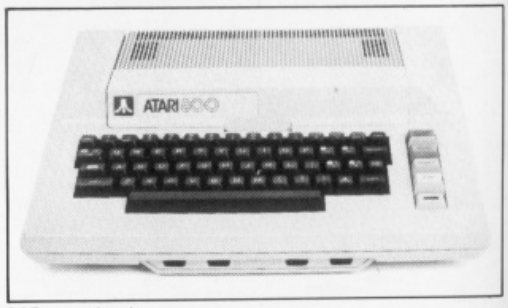
*** All above with BASIC & handbooks**



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For full details ask for our hardware leaflet (XH54J) SAE appreciated

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An independent users' group. Four issues of the club magazine for only £3.00! Address your subscription to Ron. Issue 1 of the club magazine featured a tutorial on character set redefinition and contained a collection of demonstration and games programs and lots more. Issue 2 featured a tutorial on player/missile graphics, an article about graphics on computers, a selection of members' contributions to the program library and much more.

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Datestones Of Ryn	-1C-32K-BQ22Y	£14.95
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Curse Of Ra (Part 3)	-1D-32K-BQ90X	£14.95
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The Battle Of Shiloh	-1D-40K-BQ97F	£29.95
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Arcade Games

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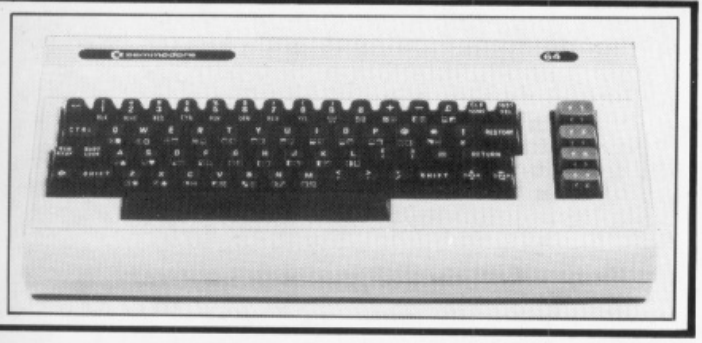
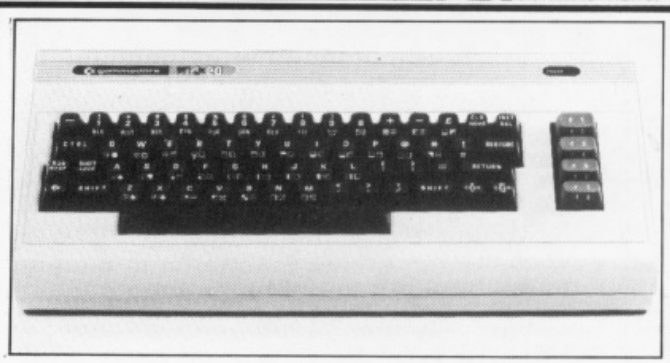
Dragon 32 computer hardware





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Key: C = Cassette. D = Disk. E = Cartridge.
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Note: Order codes shown in brackets. Prices correct at time of going to press. (Errors excluded).

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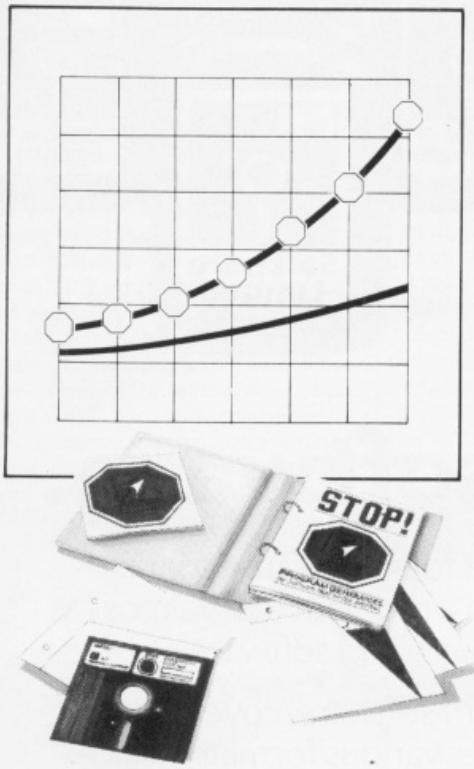

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Commodore Competition Results

First of all a big thank you to the many readers who entered our 'Win a Commodore 64 Competition'. As always, the process of deciding on a winner, and eliminating a great many worthy entries, was extremely difficult.

For those who didn't see the original entry form – we asked readers to suggest a new application for a computer in the home. You didn't have to write the program, just describe what it would do in less than 200 words. Reading through several hundred entries, it was not surprising that most of the ideas cropped up several times, but in general, the standard of the entries was very high.

How did we judge it? Well, *originality* was our first consideration, so we ruled out those entries that were merely re-hashes of existing programs. A great many submissions concerned diet planning, for example, and we have to say that this idea is as old as microcomputing itself, but has never proven successful.

Next came *imagination*. What we wanted was an idea that wasn't bounded by the current scope of computer programs. At the same time it had to be *feasible* – some of the entries would have needed a CRAY 1 to run successfully!

We considered the genuine usefulness and wideness of appeal of the program, and finally we judged how well the application had been presented.

THE WINNER

After careful consideration, the judges chose the Home Health Program idea submitted by Mr. S. Quigley – who will receive one of the first Commodore 64s to be produced for this country. Though Mr. Quigley's was only one of several Home Health ideas to be submitted, the judges considered that his was the most imaginative and versatile. We would like to point out that diagnosis by computer, even of minor illnesses, is too risky from a legal view point, though it is possible to give general advice such as 'Drink plenty of fluids, keep warm and check temperature every four hours', for example.

Our congratulations, then, to Mr. Quigley and commiserations to several hundred runners-up for some very worthy suggestions.

Commodore Competition: Home Health Program

Using the computer's memory to store family medical records- past illnesses, allergies, vaccinations and so on, would be invaluable to a docter making house-calls.

The computer could be used as a diary of medical/dental appointments, list late-duty chemists and surgery hours. As a stock-keeper the computer would ensure that the family's supplies of plasters and bandages are never depleted.

If anyone feels 'flu coming on, the computer could give a diagnosis and possible remedies (only for very simple problems), and basic courses in first aid would be educational- for example, treatment of electric shocks could be demonstrated with the computer's graphics.

A weekly home-physical on all the family could be used to check on their well-being. Heart-rate, blood pressure and temperature could be used along with age, weight and sex, to give a "fitness quotient", and a curve plotted with the results, perhaps using biorythyms.

Exercise courses run by the computer might be the answer to weight/fitness problems, and healthy diets only a button-push away.

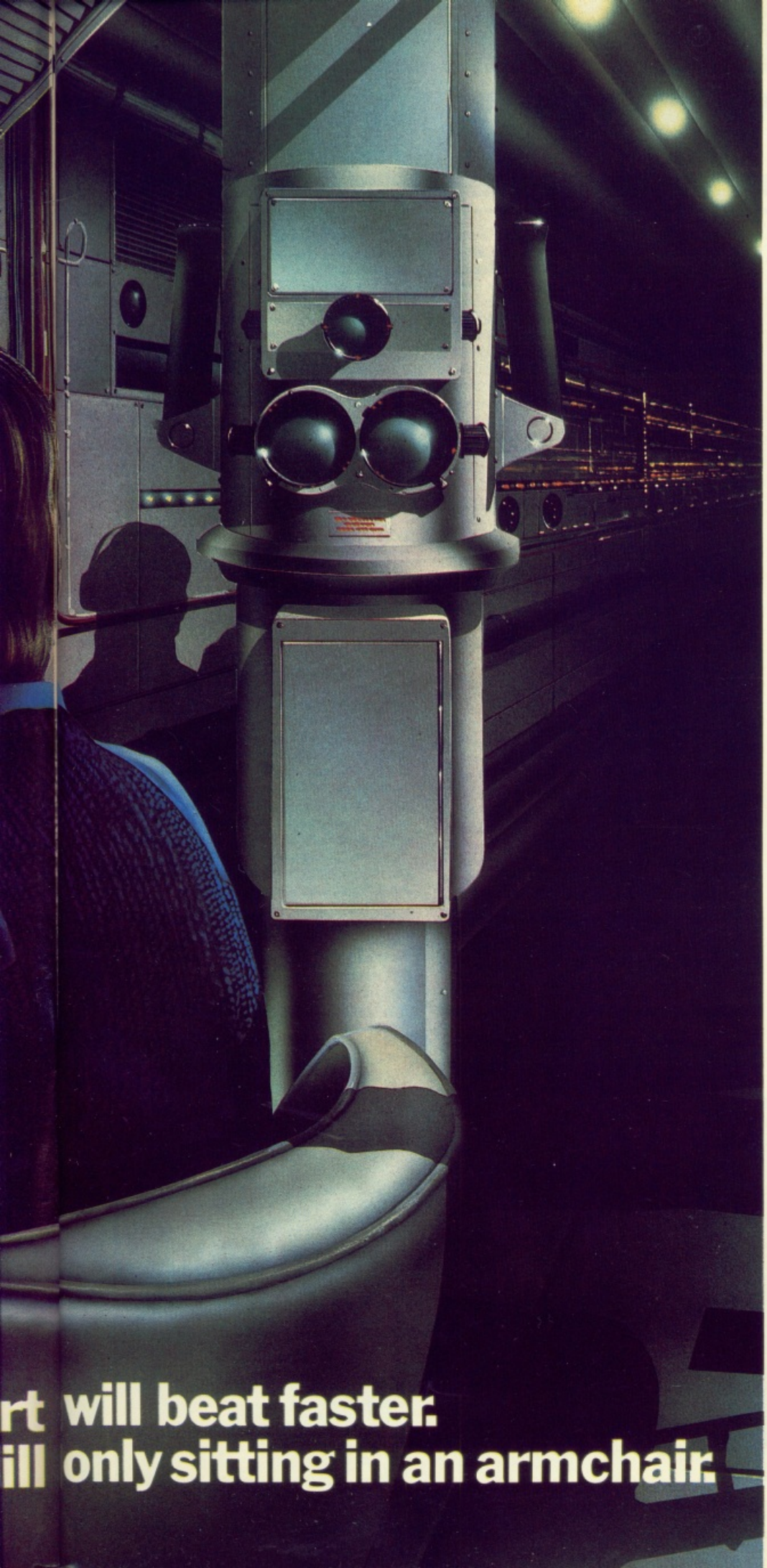
Incidently, the home-health program is intended to aid the doctor, not replace him.

Admittedly a menu is needed so that a suite of programs isn't.

Entry submitted by:

Mr. S. Quigley,
60, Tatenhill Gardens,
Cantley,
Doncaster.
South Yorkshire.
DN4 6TL

Your hands will sweat. Your heart
Your oxygen might run out. And you're still



rt will beat faster.
ill only sitting in an armchair.

At seventy fathoms the only light comes from your Sonar, steadily tracking the advancing enemy fleet.

Suddenly they're above, dropping depth charges. You could dive. But how close is the sea bed? You could attack. But how many torpedos are left? And your oxygen. Isn't it dangerously low?

Submarine Commander. 12 K ROM. Cartridge. 3 screen modes: map, sonar and periscope. 9 skill levels. Controls: Fuel. Damage Indicators. Speed. Compass Bearing. Depth Gauge. Battery Charge. Oxygen. Hydrophone/ Engine Noise. Attitude. Clock. Depth below keel. Torpedos. Tonnage Sunk.

'Submarine Commander' is one of 21 challenging new home computer games from THORN EMI, for use with Atari 400/800 or Commodore VIC 20. Like our 'Jumbo Jet Pilot' it's more a real-life simulator than a game.

But our programs aren't all work and no play. 'River Rescue', 'Kickback' and 'Soccer' are all-action games. 'Pool' and 'Darts' will suit armchair sportsmen.

And whilst budding Beethovens play the 'VIC Music Composer,' would-be Chancellors can work on their budgets with 'Home Financial Management'. We also have educational puzzles for children that will puzzle adults at higher skill levels.

But there's one simple idea behind all our titles. They're designed for players who expect more of a challenge from a video game than creatures from outer-space can provide. Now, are you sitting comfortably?

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READ/WRITE

Needle stuck

From the tone of the letter entitled 'Soap Opera', published in your September issue, and the comment following it, it is obvious that there is some mis-understanding of ICLs role in the manufacture of the Acorn computer. Hence the Director of ICLs Supply Division has written the attached letter and we would appreciate it if you would publish it in a forthcoming issue, as a means of putting the record straight.

K.G.Howe
Chief Media Relations Officer
International Computers Ltd
Putney SW15 1SW

For Publication in MicroComputer Printout
Dear Sir
I would like to correct some misconceptions which have arisen regarding ICLs role in the production of the Acorn computers, commonly known as the BBC micro.

ICL has undertaken to produce printed circuit boards for inclusion in the micro and is one of several companies which assembles and tests it using components supplied by Acorn computers.

ICL has already produced 17,500 units, of which the majority are Model Bs, and has just signed a second agreement to produce a further 12,500 over the next six months.

Materials supply and design engineering problems outside ICLs control affected the rate of production earlier this year, but both ICL and Acorn management are confident that the improvement achieved in recent weeks will be maintained throughout the duration of the new contract.

C.W.Beaumont
Director of Supply Division, ICL

Yawn! – Oh, really!

DALLAS

I just read the August 1982 issue of your wonderful publication called *MicroComputer Printout*. I wish to commend you on the high standard of the work!

However, my comment is this: why are there so many articles and advertisements on the Commodore VIC-20 (PET). As I own a TI 99/4A and am a very keen micro-computerist, would you be able to include more articles on the TI99/4A? Would you also let me know whether in your previous issues there are any articles/reviews on TI 99/4A. I should like, if possible, to purchase any back issues.

Peter Lian
Singapore

Interestingly enough, MicroComputer Printout *was one of the few magazines to rate the TI 99/4A as good value for money at its original price of £299 (our full review appeared in the May 1982 issue). Now that it can be obtained in the UK for as little as £150 we would strongly recommend it to any first time buyer.*

The reason why little is seen of the '99 in the press is very interesting and relates directly to TIs marketing. The '99 is sold as a complete package: documentation is excellent, and the BASIC has good commands to handle all its sophisticated features. But there is no access to the machine at 'system level' (i.e. machine code). These two factors, have meant that there is little need or scope for additional documentation, and more important – the '99 is not a machine that appeals to the technical enthusiast.

Furthermore, TI being a staid and reputable company, deal only with staid and reputable dealers. They generally do supply peripherals when they say they will and have a complete range available. In contrast to (say) the VIC, the '99 does not rely on activity in the marketplace as a strong selling point. TI have not actively encouraged the selling of software and hardware add-ons by third party suppliers – hence a lack of advertising.

This whole area of the 'activity' surrounding a micro is one that we shall return to in a later article. Another contributing factor is that up to now, sales of the '99 have been very limited. The recent price drops, however, should do a lot to change this situation.

FORTH right advice

It was with great interest that I read of your editorial policy with regards FORTH in Lindsay Doyle's article 'Six months with a robot' (Oct.'82). A brief description of the Jupiter Ace appearing in the same issue (Hotline) again puts FORTH under the spotlight.

Stimulated by Mr. Doyle's plea for phone calls, expressing a wish for a change of policy, I write this letter, which will hopefuly be one of many.

FORTH is fast, compact and extensable, an ideal language for microcomputer users, allowing structured programming with top-down development and virtual memory. Surely such properties should not remain privvy to the few 'cult' users.

Hopefully we will soon see a little more editorial FORTHsight in the otherwsie worthy pages of *Microcomputer Printout*

F.Renouf
Southampton

This is one of those unfortunately (unFORTHunately, surely? – Ed) *chicken-and-egg situations. FORTH won't take off until more people are using it, and more people won't use it until it takes off!*

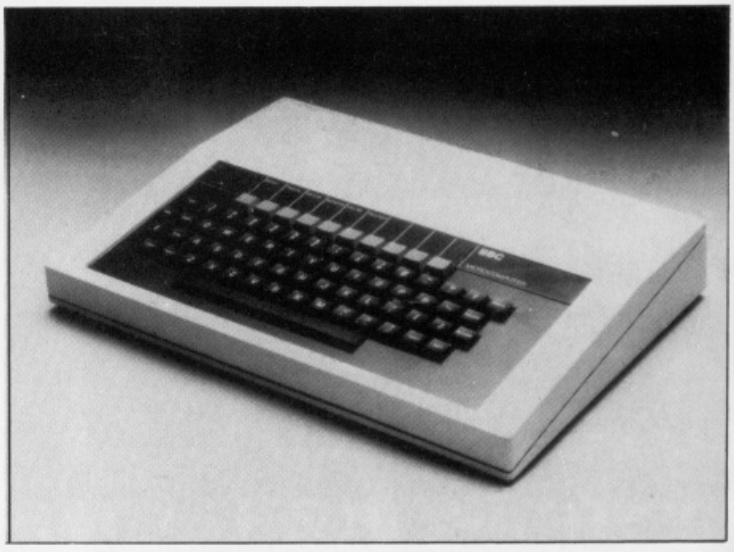
Don't get us wrong, Mr. Renouf, we have nothing against the language FORTH – indeed, we would agree that it is a better language for program development. What we have been anxious to avoid, however, is an academic discussion on which is the best language for learning – when in practical terms there is little or no choice.

Clearly this is just beginning to change, so don't worry – we will be writing about FORTH, but from a practical availability viewpoint – not a theoretical comparison.

Two Controversial Machines

Texas Instruments' TI99/4A (left) represents good value for money but makes little noise in the market place – see *Dallas*.

The BBC (right) has suffered many production delays, as defended in *Needle Stuck*.



READ/WRITE

The Editor welcomes your letters, but if you require a personal reply please enclose an S.A.E.

Grauniad syndrome

I always enjoy *MicroComputer Printout* and find it a valuable source of information. It usually is well produced and pleasant to read – but what a mess the November issue turned out to be.

Even if you had purposely added all the spelling errors and doubled paragraphs as one of your obscure jokes you couldn't have made more mess.

3 out of 10. Please try harder next time

J.Jarratt

Welwyn Garden City, Herts

The Editor replies: *We apologise sincerely for any errors which crept into the November issue. Unusually high sunspot activity over the Yateley area (giving rise to bit-errors on our disk based typesetter), unusually protracted hangover in the Art Department (caused by intensive celebration at having finally acquired a drawing board) and other factors beyond the publisher's control, all had little or nothing to do with it.*

Grovel

Are you really giving flowchart stencils away free! I've got 110 pupils and they all share mine (our Head says the school is terribly poor and I can believe it). Please send me some. A set of the Programmer Crib Cards would also be appreciated, but we do not need them as much.

(Now entering Grovel Mode)

Congratulations on an excellent magazine. I've got every issue, right back to the first one from December 1979 with 20 pages. This last issue has over 100 pages at the same price so how can you afford to give anything away? No, don't tell me; it is because you now let posh people who don't own PETs read it. Well some good had to come of it I suppose. I read it from cover to cover and enjoy all the articles, but there do seem to be a lot of adverts for things I can't afford.

Robert Chrismas

Teacher in charge of Computer Studies

Bridgemary Community School, Hants.

We'll have a word with the advertisers on your behalf, Robert – see if we can't get some of these prices down. Mind you – judging by the number of solicitor's letters Julian Allason gets us each month, we probably won't have any *advertising by Christmas! [Memo to Art Editor: Mike, this letter is good publicity - make sure it goes at the top of the page in bold type – Ed]*

Note to readers: *Thanks to the enthusiasm with which our offer of free stencils was taken up, stocks are now exhausted. We do, however, have plenty of spare copies of the colour poster in last month's issue. Again, we will offer one or more posters free to any school or training organization that sends a stamped addressed envelope (10x8ins) to* MicroComputer Printout *marked 'Poster'.*

Make someone happy...

I do not buy any micro magazine regularly, but only as my interest is caught by a particular article. Lately I have bought your magazine because of the articles on enhanced BASIC for the PET, but I must confess that my knowledge of machine code was nil, even to the extent of not knowing how to enter the monitor, in spite of frustrated searching of manuals etc. In desperation I eventually phoned the number given at the end of the last article and was agreeably surprised when it was answered by Dave Barrett, the author himself. Over a period and during the course of 3 phone calls he not only explained several points in the article which were causing difficulties to a novice like myself, but also patiently conveyed some of the very elementary but essential knowledge which I myself lacked and needed before I could make a start.

I am most grateful for the trouble he has taken and look forward to his future articles with keen interest.

Brian Adams

Liverpool

Thank you for your letter, Mr. Adams, Daves Barrett and Wardill deserve a great deal of thanks from the many readers they have helped with similar queries. Readers may like to know that Martin 'Legless' Banks has offered a personal consultation service on matters legal, philosophical and (preferably) alcoholic.

Chip on shoulder

Regarding the number of 32-bit registers on the 16032, perhaps you should purchase Tommy a stronger magnifying glass. To come up with 16 registers, it is not only necessary to pretend that the program counter is a register, it is also necessary to pretend that the MOD and PSR registers are 32-bits in length. In fact, the MOD register is only 16-bits long and the status register contains only 10-bits.

By the way, the 6502 is really a 16-bit processor. The program counter register is 16-bits long, right?

It is interesting to note on page 24 of your October issue that the VIC-20 is selling for £199 in Britain. In LA the same machine sells for $169.

It is becoming increasingly clear why the British Empire is shrinking!

Anonymous

Santa Ana, California

Anonymous! Santa Ana? Come off it! Do we detect just the teensiest hint of axe-grinding going on in the background? Surely this couldn't be coming from someone who supports another microprocessor, could it?

Anyway, who says the British Empire is shrinking? Still we agree about the pricing, £169 (current r.r.p) against $169 seems a trifle excessive. Interestingly, however, the Commodore '64 has been announced here at £299 compared with $595 in the USA, we believe.

Disgruntled

You appear never to have heard of machines such as the Triton? Let me put you in the know.

Triton was in '79 what the Beeb is now, the best UK machine on the market, and it was the machine that launched a 'minor' company nowadays – Transam – you may have heard of them – and Mike Hughes for that matter (should I say Mike P50 Hughes – in-Triton joke!) and his second brain child, the Tuscan S-100 microcomputer.

These minor and tinny machines are of no signifance, they only run CP/M, hard-disks, and are generally regarded as an example of good quality British Computer Technology, but if you prefer the electronic doorstep, or it's Technicolour mate, the Spectrum, then let me not interfere. The Triton and Tuscan are *hobbyist* machines – i.e. soldering-iron wielding variety.

Yours, a disgruntled Triton owner.

Aidan Pennington

P.S Any Triton owner who is not a member of the new Independent Triton User Group should contact

Andy Laurie

Conifers, Townsend Road

Ashford, Mddx

(subs are £5 a year)

Never heard of it – or the Triton computer.

Fanmail

Dear Dogbreath,

We think your hotline column is a load of cr*p and that Julian Allason is a complete nurd.

Any further rubbishing of the *Triton* and me mate Big Douglas will be round to show you his bunch of fives.

So watch it.

(Signed) Darren and the Gang

St. Edward's School, London E1

Julian Allason writes:

Thank you for your interesting letter. It's always good to have the intellectual tone of the magaziene raised by a bit of feedback from readers.

Your Headmaster has kindly give me your home address and I shall be sending some gentlemen who work in our Debt Recovery department round to see you.

Do stay in touch as we shall be interested to know how you and Big Douglas get on without knee caps.

Yours sincerely

Dogbreath

P.S Pity about the Triton.

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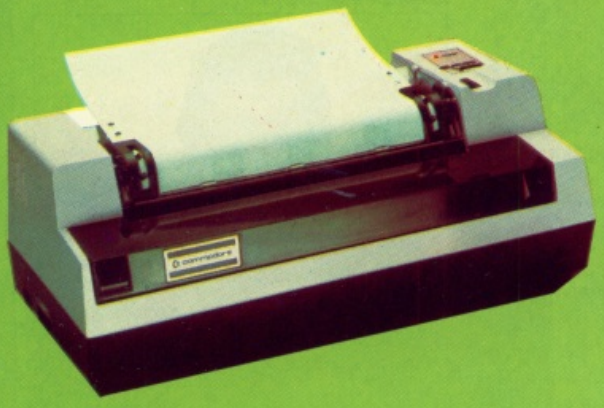

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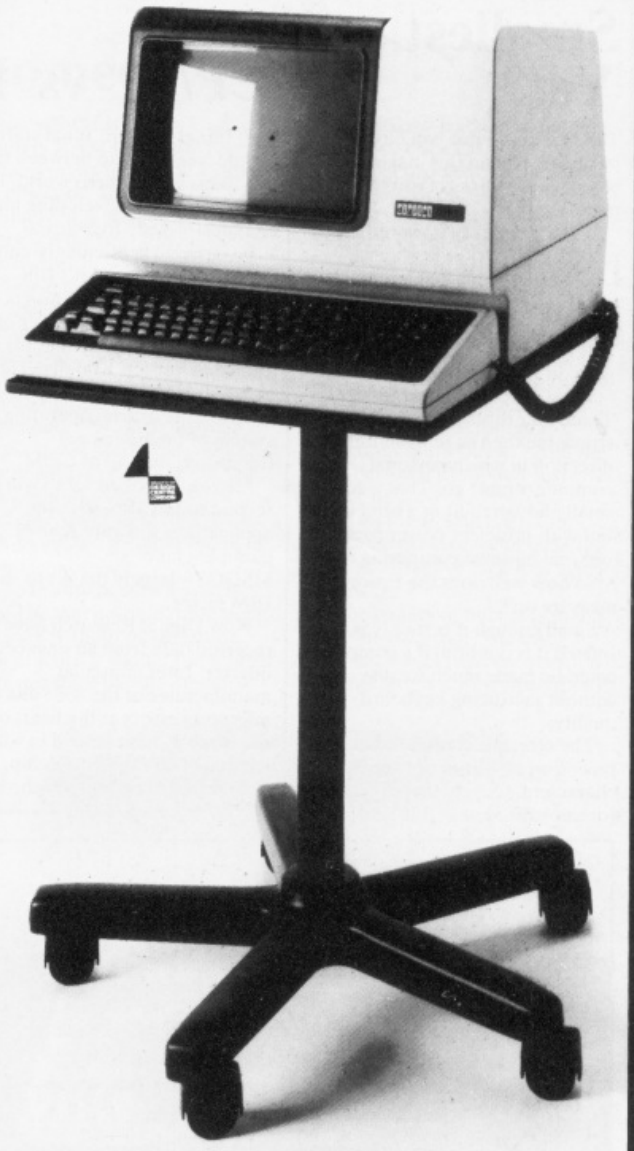

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Smallest Yet?

The next computer you buy may be no larger than this magazine, albeit a little thicker (you too, mate!)

It will be battery powered, have a proper typewriter keyboard, LCD screen, built-in microcassette tape storage, and its own integral printer.

It is the Epson HX-20, and it goes on sale here shortly.

I first tried it at the Hanover Trade Fair this Spring, and it struck me then as representing the direction in which personal computers must go. That is to say, small enough to fit *in* a brief case, but with sufficient power to carry out real business computing tasks.

So how well does the Epson measure up?

Small enough it certainly is. Indeed it is doubtful if a computer could be made much smaller without sacrificing keyboard quality.

The screen is configured at power-on as 4-lines of twenty characters. Clearly there is room for improvement in this format as

display technology develops. Epson have, however, made provision in the software for lines of up to 255 characters in length.

A CRT controller is promised, so it should be possible to generate longer lines by plugging into an ordinary TV.

The HX-20 is being supplied with 16K bytes of RAM memory as standard, of which 12.6K (about 13,000 characters worth), will be available to the user. This can be expanded to 28.6 KB.

The 32K of ROM, containing the operating system and Microsoft BASIC, can be expanded to a maximum of 72KB, so various plug-in goodies are clearly envisaged.

The HX-20 uses CMOS circuitry causing a very low power drain on the rechargable nickle-cadmium batteries. The company reckon they should give 40 to 50 hours of normal use before needing a top-up at the mains.

Epson reckon to have an astonishing 40% of the world market for computer printers, so one can expect the printer to live up to the claims made for it. Specifically these are that it should out-last the computer(!).

The printer prints upper and lower case characters, twenty four to the line, on a 5 x 7 matrix. The speed is an acceptable 42 lines per minute.

Back up storage is provided for microcassette tapes similar to those used in dictating machines. Floppy disks – probably of the miniature Sony variety – are promised. And so is all accoustic coupler for communication over telephone lines.

The HX-20 will be sharing my life for the next month. I will let you know how we get on.

CP/M vs MSDOS Punchup - Cont.

Biff! Bang! Wallop! What started as a discreet dust up between the two titans of the micro world, is showing signs of developing into an industry-wide free-for-all.

It started in gentlemanly-enough fashion with Microsoft's Bill Gates directing IBM to his good friend, Gary Kildall founder of Digital Research. For reasons best known to himself Kildall declined to assist and IBM ended up making MSDOS the official operating system of their Personal Computer, instead of CP/M.

Microsoft looked set to win the second round also, with the applications software houses plumping more and more for MSDOS – largely thanks to the IBM factor.

Now Digital Research have received help from an unexpected quarter. Intel, muscular manufacturer of the 8086 and 8088 microprocessors at the heart of the trouble, have waded in with a version of CP/M 86 on a chip.

This particular shilaleagh, designated the 80150 co-processor, will speed up execution time (CP/M 86 had been critised for being too slow) and cut costs. It also has the interesting capability of enabling a portion of RAM memory to be treated as if it were a floppy disk.

The significance of this is that it will enable *standard* CP/M 86 programs to be run on portable, diskless computers. And take Uncle Julian's word for it; portable 16-bit computers are just around the corner.

Digital Research haven't been slow to defend themselves and their market either, G. Kildall having just announced concurrent CP/M, CP/M for the 16/32-bit Motorola 68000 (which should be a reference to Tim Keen and his *Corvus Concept* marketeers), and a new version of the original 8-bit MP/M operating system that actually works.

All good knock about stuff, you may consider. Others might think differently. "I just pray that one of these operating systems engages a clear winner, otherwise it will be a nightmare for us trying to support them all", one well known software publisher told me.

In my experience such nightmares have a way of translating themselves into bigger bills for you and me.

P.S. Digital Research are organizing the first CP/M exhibition from January 21st to 23rd at San Fransisco's enormous Moscone Centre. There will be over 200 stands devoted to CP/M applications packages, development aids, microcomputers, peripherals and publications, plus a series of workshops addressed by the like of Adam Osborne, and of course, Gary Kildall himself.

Details of *CP/M83* from Northeast Expositions Inc, 824 Boylston Street, Chestnut Hill, Massachusetts 02167. Tel: 0101-617-739-2000.

Beat that, Bill Gates!

Yes We Have No Banana

The Editor has forbidden me to recount you the (true) story about Bridgette Bardot and my banana. So instead I shall tell you about a computer that counts them. [*This better be good – Ed*]

The new micro comes from Geest, the big banana amongst fruit importers, and was orginally developed for the purposes of maintaining files on some 300 of their grocers.

"Our micro is very simple to maintain, and we have found someone in the West Indies who can maintain it," says Dr. Derek Bilby of Geest Computer Services (tel: 0733-51231).

The banana micro is based on the good old Z-80 chip, rejoices in 64K bytes of RAM memory, and offers a choice of twin 5 1/4" or 8" floppy disk drives, or an on-board Winchester disk for storing all the information about bananas. [*If this isn't true, I will be having you, my son – Ed*].

"We had a problem with voltage fluctuations in St. Lucia, which we overcame with a voltage stabilizer," says Dr. Bilby. "And that was the only slip-up..."

[*Agghh! – Ed*].

Curses!

Aaaghr! I have just erased the entire file containing this month's *Hotline*. Gone! Vanished! Just like that!

Were I the proud owner of *Filefix*, strange oaths would not have rent the Berkshire air. The diskette would not have been danced upon. My secretary would not now be in tears.

For with *Filefix* I could have identified and recovered the erased file, and then protected it against future clumsiness. I would also be able to delete and rename files, and forge mulitiple user links to a single CP/M file.

All these operations are performed on the directory itself, so data in the actual files isn't altered.

Alas I do not own a copy of *Filefix*, and have been unable to discover a UK distributor. After this latest catastrophe, I think I shall have to send $100 to Digital Marketing at 2670 Cherry Lane, Walnut Creek, California 94596, for a copy.

by Julian Allason

Bookworm

As a cupidiuous consumer of computer books, your columnist is uncomfortably aware of a certain lack of bibiophilic coverage in this organ.

Clearly this, along with the dripping bathroom tap, our ceaseless attention to the activities of Martin 'Legless' Banks, and a capable lack of cheesecake, constitute a wrong to be righted.

Here goes.

The very best place to start is with *George's Computer Book Catalogue*. George is actually the delightful Jean Young who tells me that "the catalogue started as a labour of love but ended as hard labour". Thumbing through its thousands of entries, all neatly cross indexed under a variety of headings, it represents very good value at £2 from George's Booksellers, 89 Park Street, Bristol, BSl 5PW. (tel: 0272-276602).

Another essential tome is *A Handbook of New Office Technology* (Century paperback £5.95) by our combative contributor John Derrick, who with partner Philip Oppenheim, has double handedly antagonized the office equipment industry with their scathing vericurs in *What To Buy For Business* magazine.

Much of the material, which covers everything from copiers to computers, first appeared in *WTBFB*, but is none-the-less useful for that. They also float the only convincing scenario for the office of the future we have yet encountered.

A good stock of computer titles, including several I have failed to track down elsewhere, is held by Watford Technical Books at 105 St. Albans Road, Watford. Who will supply a full list upon receipt of an S.A.E.

Owner Jeremy Dicks tells me they are the only bookshop in Watford not to stock *Not the F-Plan Diet of an Edwardian Parrot*. I don't doubt it.

They also offer a telephone service for credit card owners on 0923-23324, as does Mine of Information who hold at least as large a stock. MOI are on 0727-52801.

Disk Drives Doomed

Here at your favourite computer ragazine we have evolved the ultimate test for new technology. We let the Daily Telegraph's inimitable Science Correspondant, Adrian Berry loose on it. If it can survive three days of Adrian's attentions, it will survive anything.

It is my sad duty then to inform you of the impending demise of the floppy disk. No less than five Commodore disks have failed the Telegraph test, and not even the Sirius drives proved totally Berry-proof.

What then is to replace them?

Some new solid state technology, perhaps.

The probable answer is 'No' and 'Yes'.

Yes, on-line memory will become solid-state, and No, the technology won't be new.

Think Bubble. Five years ago lots of people, notably Texas Instruments, did. Now, just when the principal manufacturers are starting to shut up shop, Bubble memory is about to stage a remarkable come-back.

There are several reasons.

Firstly, unlike disk it has nothing mechanical to go wrong. Bubble should safely survive the sort of shaking that gives Adam Osborne nightmares.

Secondly, it is stable. Unlike ordinary RAM chips, the memory remains intact when you switch the power off and on.

Finally, it is compact, more so than even the new slim line floppy disk drives.

Couple these with the extraordinary demand for a truly portable *business* computer, and what do you get?

My guess would have been something resembling the new *Commodore 64*. That is to say a proper typewriter keyboard and a decent amount of RAM stuffed into a box small enough to fit in a brief case. Instead of disk drives, a built-in bubble memory board of equivalent capacity.

The beauty of such a system would be that it would run standard software without modification.

In practice it should run quite a bit faster since bubble memory access takes a fraction of the time a disk drive does.

The big problem with Bubble was always price. Somehow the redoubtable John Chew of Kingston Computers (tel: 0262-73036) seems to have got round this. He reckons to have a 128K Bubble RAM disk board for the *Commodore 64* on sale by the time you read this. Price – about £295. And even that will come down if it really catches on.

"Bubble is ideal for data collection," says Chew. "And the IBM Personal Computer just cries out for it."

An Apple II with a built-in bubble board in place of disks has to be an attractive idea too. Chew agrees.

"The beauty of bubble is that it is brown-out proof," he says.

Which leaves just one question unanswered: is it Berry-proof too?

Bristol: the Silicon Story

When *Silicon Office* first appeared my good friend Richard Pawson hailed it on these pages as the first genuinely useful all purpose piece of micro software, thereby putting a number of noses out of joint.

Nothing that has appeared since by way of all singing, all dancing database-cum-word processor-cum-accounting suites has caused our esteemed editor to change his mind.

Unless it is *Silicon Office-C*, a new version for the equally new Commodore hard disk drives. It sings more songs, (5 megabytes worth of memory), dances faster (4 to 5 times), and costs more: £990 + VAT.

What's that? You are one of the three thousand odd existing *Silicon Office*-workers? Then upgrade, dear boy. Add the Commodore's 9060 or 9090 hard disk drive to your CBM/PET system, send Bristol Software Factory a cheque for £200 + VAT, and enjoy life.

Write to Bristol Software Factory at Kingson's House, Grove Avenue, Queen's Square, Bristol BS1 4QY, or telephone them on 0272-277135, but no jokes about Bristols and implants please; they have heard them *all* before.

Smaller, Faster CIS – COBOL

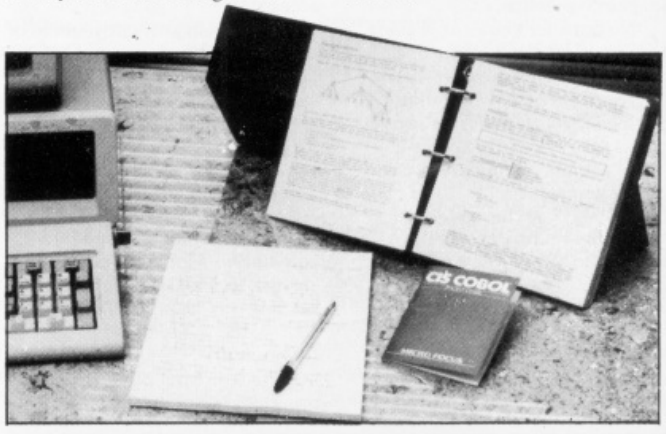
No one could ever accuse Micro Focus of resting on their laurels. Their *CIS COBOL* counpiler may dominate the market, but they don't sit still.

Latest word from number 58 Acacia Road, NW8 is of a faster, more compact version with better documentation.

For version 4.5, the ISAM facility has been redesigned to allow for faster indexed sequential processing, and the size of the runtime system reduced.

The new package is available for CP/M *and* CP/M86, making programs written on 8-bit micros compatible, which should warm their distributors' cockles.

The price remains the same at £425. Existing users can upgrade for £90.



Texas – The Big One

Modesty, and a healthy respect for Texas Instruments writ-issuing department, prevents me from posing the question that so amimated the dealer network this month.

[Go on then; we will stand your legal costs – Ed].

Has TI gone off their trolley?

Let me tell you a story about two micro manufacturers. Both had handsome personal computers selling for about £200. Both thought they could sell even more if the price was £150.

One – let us call him Commodore – simply reduced the trade price by a quarter, from, let us say, around £130 down to £100.

The other – let us call him TI – kept the trade price at around £130, but offered to send purchasers a safe cheque for £50.

So although both computers sold for £150, and both gave dealers similar trade terms, Commodore now made approximately £100 on every sale, while TI received only around £80.

Hmm.

Well, we asked Texas about this interesting strategy, and they said – "Hmmmm".

Then they explained that it was important to preserve dealer margins. And then they said that lower prices meant larger sales, and larger sales meant lower production costs, and that anyway they made their money out of follow-up sales of software and peripherals.

Not that their software and peripherals were too expensive. My word no. Why they had just reduced the price of some of more too.

Hmm.

Still, why should we worry? The TI99/4A is a true computer and at £150, excellent value. If Texas want to play ducks and drakes with their trade pricing, should it bother us?

Hmm.

I meet the Sponge

Had an intriguing chat with Neil Hewitt of Stage One Computers, the *Administrator* people, this week.

Neil has pretty firm ideas about what a business program should be, and his software team have spent the last three years putting them into practice.

"No outsider knows or is going to learn as much about the business as the proprieter, so we have tried to create a system which allows the businessman to design and set up his own system," says Neil. "And without having to learn programming".

"The stage we have reached now with the software, permits the user to set up whatever system he wants."

So it is a database?

"I am reluctant to call it that. What I do believe is that most commercial applications require the ability to store records of unlimited length. The *Administrator* provides that facility."

One of the other notable features of Stage One's System is that you are not continually having to switch from mode to mode. Everything is always immediately accessible.

All of which puts one in mind of the *Silicon Office* system. Neil Hewitt disagrees.

"Silicon Office is a really a command-level language, whereas we don't believe you should have to contend with a language at all."

Like *Silicon Office*, the *Administrator* was until recently available only for Commodore computers. That is about to change, as it makes its appearance running on the *Sirius*, and, in due course, the *IBM Personal Computer*.

"The structural design of the programs has always been such that we could jump individual system limitations," he explains. "That is precisely what we did with the Commodore Disk Operating System, we jumped over it, straight to track and sector."

A new version called *Administrator II* runs on the Commodore 8096, the business version of the PET with 96K of RAM. Neil Hewitt says the increase in speed is dramatic.

Stage One have recently rechristened themselves SOSOFT. You will find them at 300 Ashley Road, Poole, Dorset. Tel 0202-735656.

Rumour has it that SOSOFT have developed a remarkable new facility called the Sponge, so-named on account of its abilty to absorb data from other programs!

Hewitt denies it. But then he would, wouldn't he?

Chinese Copy

Some of us have enough trouble making our BASIC programs do what they ought. Imagine the added difficulty if your native language is not English.

French efforts to prevent the anglicization of their mother tongue resulted in an hilarious indiginous version of BASIC along the lines of:

```
100 SI A = B PUIS IMPRIME
"SAPRISTI": FIN
```

The difficulties of programming in high level languages must be considerably compounded where one's first language uses a non-Roman character set, as in Chinese.

My friend George Huang in Taiwan thinks he has solved the problem with his Chinese BASIC cartridge. The software contained in it translates the forty six most frequently used BASIC graphic and system commands into Chinese characters.

So a short routine in standard BASIC:

```
20  DIM A(20)
30  REM  ASSIGN A(I)
40  FOR I = 1 TO 20
50 A(I) = 5 * I + 2
60  NEXT I
70  REM  PRINT A(I)
80  FOR I = 1 TO 20
90  PRINT A(I)
100  NEXT I
```

comes out looking like this:

```
20 方陣A(20)
30 註解 ASSIGN A(I).
40 從I = 1至|20
50 A(I) = 5 * I + 2
60 下個I
70 註解 PRINT A(I)
80 從I = 1至|20
90 顯示A(I)
100 下個I
```

George's company, Multitech Industrial Corporation of 977 Min Shan E. Road, Taipei, reckon to be able to get any language up and running on a cartridge within two months.

Anyone for Serbo-Croat?

by Julian Allason

O.H.M.S

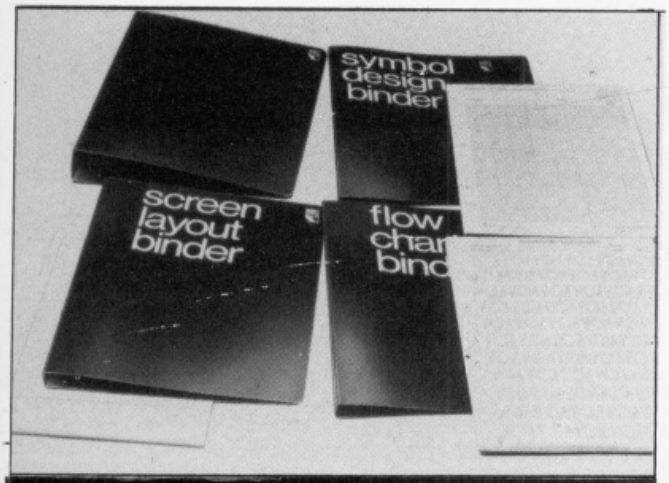
According to my friend Bradbeer, most micro programs are conceived in ignorance and executed in sloth.

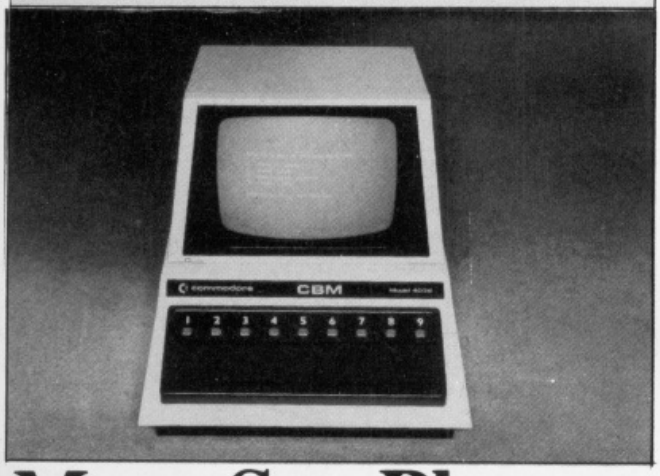
Intastor Micro Aids propose to cure BBC Micro-users of this 'design-the-program-as-you-go' syndrome with their official BBC Programmer's Kit. To further discourage backsliding, the kit is finished in official BBC livery.

Contained within is an official flow chart pad, official screen layout pad, and official symbol design pad, each of 100 sheets.

The pads are bound within indestructable black polypropylene official binders, inside the covers of which are printed useful reference items. These include official BBC Microcomputer screen models, officially suggested symbols and offical key list of logical colour changes between models.

The Official Special Launch Price is £9.90, plus £1 p&p, from Intastor Micro Aids, FREEPOST, Stroud, Glos.





More Sex Please

I have always maintained that we *MicroComputer Printout* – reading types were superior persons.

Confirmation of this self-evident fact comes from the boffins at M.S. Electronics Marketing, who, after exhaustive study, have discovered that the ordinary people are unable to use keyboards of the QWERTY variety.

Indeed it seems that the lidi – poloi (*anti-elitist editorial note: lidi-poloi = common people*) can only be trusted to select from a choice of YES, NO or MAYBE.

The result is the *Interactive Computer Keyboard*, which has just three keys. Where menu selection cannot be avoided, a ten key version (illustrated) is available.

With the arrival of interactive cable TV, this will permit the selection of [1] more sex, [2] more violence, [3] more offensive language, [4] more sex, violence and offensive language, etc. etc.

M.S. Electronics Marketing are at 41 Palace Road, Bromley, Kent.

MAYBE.

8-bit + 16-bit = ?

Tom Fitzpatrick is not a man to muck about. So when his firm, LSI Computers of Woking, set about designing their own micro-computer, they didn't get involved in the 8-bit or 16-bit CPU argument; they just stuck in one of each.

Tom reckons that as the 16-bit software becomes available, purchasers of his new *M-Four* computer will buy that, using their existing 8-bit software for the fill-in jobs for which new software is not worth while.

Like the *IBM PC* and *Sirius*, the *M-Four* uses the Intel 8088 microprocessor. Like half the 8-bit systems in the world it has a Z-80 CPU – the souped-up Z80B, which runs at a spanking 5MHz.

Changing from 8-bit to 16-bit operation is controlled by software commands.

For storage, LSI offer a variety of options ranging from 350K floppy disk drives, of which Tom is understandably not expecting to sell many, up to 10 megabyte 5 1/4" Winchester disks.

The keyboard has no less than 33 user programmable keys; the screen 1920 characters; while the gubbins round the back include three RS232C ports, one of them Async/Sync, one RS422 port and a Centronics compatible printer port.

Tom thinks the £2000 plus (according to specification) price tag could justify the *M-Four*, even if a customer had no 16-bit software at all at present but expected to go that way in the future.

"The cost of changing all existing software to 16-bit, when only one or two programs actually needed the upgrade, would more than equal the increment in cost of the *M-Four* over 8-bit or 16-bit single processor machines."

DEC, who just happen to be the most successful minicomputer vendor in the world reached the same conclusion with their *Rainbow* micro.

It will be interesting to see if the customer follows the logic.

'Anything-to-Anything' Interface

Q. When is an interface not an interface?

A. When it is a computer.

Confused? I know I am. I always used to think of an interface as a black box that mysteriously made connection possible between a computer and an otherwise incompatible peripheral.

Now the interface itself is turning into a computer. Take *Interpod* the new 'anything-to-anything' interface from the *Petspeed* mob up at Oxford Computer Systems.

It has its own microprocessor, its own memory, and allows the *VIC-20* and *Commodore 64* to link to a whole range of IEEE devices. Yet it is completely transparent to the user and, say Oxford Computer Systems, interferes not at all with either computer or peripherals.

Note for Boffins: The interface will not only connect parallel IEEE to Commodore serial, and vice-versa, but will also convert either bus to RS232.

£95 cheques to OCS at The Old Signal Box (really!), Hensington Road, Woodstock, Oxford. Tel: 0993 812700.

Mr. Hale and his Amazing Peachtree

As the battle for the business software market hots up, one name is being increasingly mentioned: Peachtree.

In America Peachtree, part of the world's largest software house MSA, are market leaders. Can they repeat the trick here? JULIAN ALLASON interrogated Managing Director, JOHN HALE

Allason: "Your software is widely regarded as sound but unexciting."

Hale: "Peachtree has a reputation for being boring and pedestrian. And I am quite pleased about it, because it means the software is stable."

"We have been criticized by some custosmers for not fully exploiting the capabilities of the new 16-bit micros, on the IBM Personal Computer. What we are offering essentially are our 8-bit programs converted."

"But that is the point. We should not *be* the leading edge. Our intention is to offer neat and tested software people can trust."

"If I were a businessman I would be browned off to discover that the software I have just bought was suddenly obsolete. But it will be."

"With so many hardware developments taking place so rapidly, we obviously can't guarantee that each new release of our software will be totally compatible with its predecessors."

"What we can do is ensure that the procedures – the way in which the system operates – and the data are preserved. So if you upgrade to a 16-bit system, say, you will need a new program. But you won't have to retrain your staff to use it, or to rekey in all the data."

"To my mind that is far more important than being first kid on the block with colour graphics and speech."

Allason: "No colour graphics or speech then?"

Hale: "We will have them *next* year!"

Allason: "What *don't* you like about Peachtree software?"

Hale: "One great complaint I have is that Peachtree isn't growing round a database management system – yet."

"You see I come to this area with a personal perception that it is to do with information processing – not Pacman."

Allason: "You won't be going into the games business then?"

Hale: "We might. *Pacman* and *Adventure* have characteristics in common with word processing and spreadsheet softwear. They are completely self-sufficient, and can be sold my mail order without support."

Allason: "Are you irrevocably committed to the CP/M operating system?"

Hale: "Lots of people think we are, probably because we were one of the people who helped make it a success in the States; we have 800 dealers there."

The IBM Personal Computer, which I use myself incidentally, took us away from CP/M for the first time. IBM had commissioned MSDOS from Microsoft. In fact, we are just about to start supporting MSDOS here with the launch of our programs on the *Sirius 1*."

"We think it is very healthy that there should be two operating systems."

Allason: "What do you see in your crystal ball?"

Hale: "Xenix. An inevitable trend toward software being sold as hardware. I can see IBMs mainframe DOS working on a micro one day."

STOP PRESS: *Peachtree have just formally announced two colour graphics systems referred to by John Hale.*

Peachtree Business Graphics System is a menu-driven graphics application program for CP/M based computers, that provides a link to their ***Peach Calc*** *spreadsheet program, and to the* ***Peach Text*** *word processor, better known as* ***Magic Wand.***

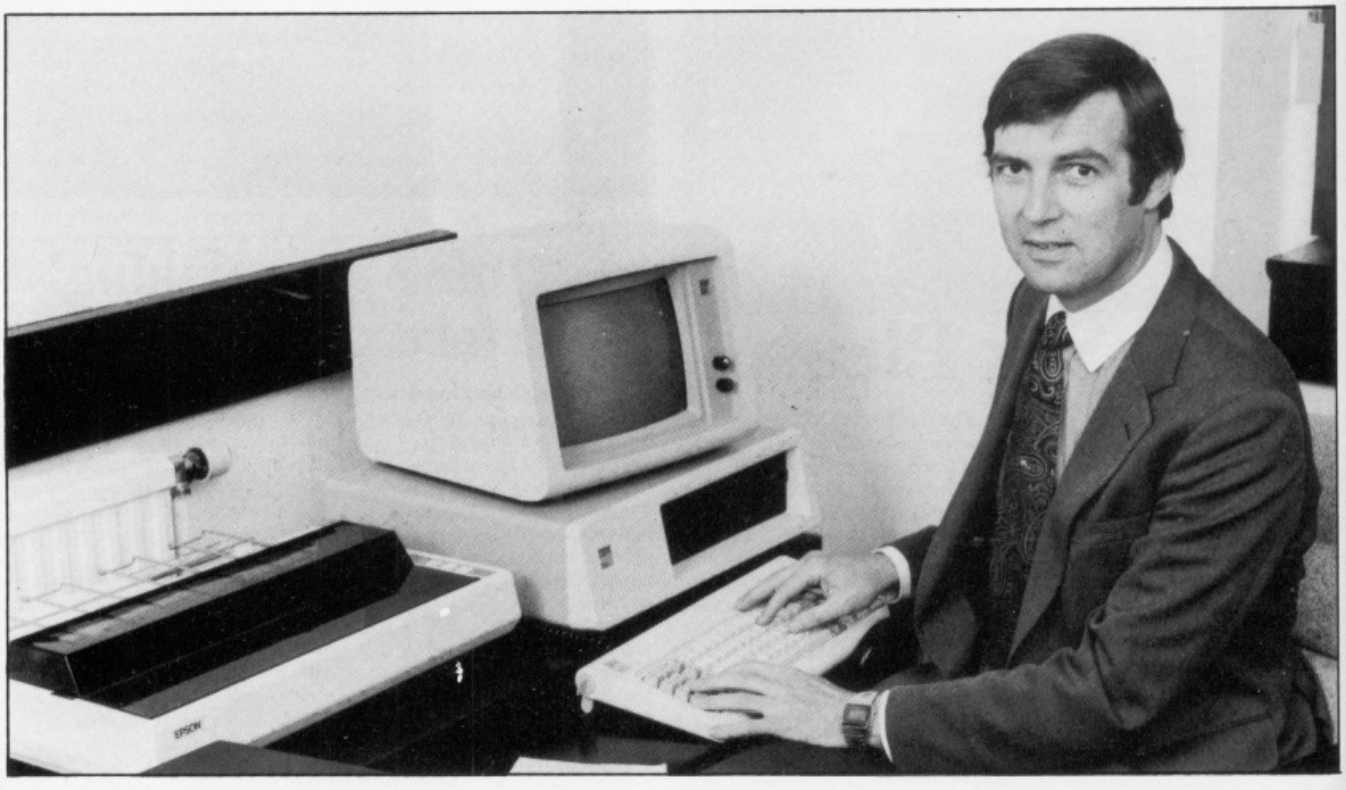
The second product is an interactive graphics programming language also for microcomputers running CP/M, called ***Peachtree Graphics Language.***

Its features include pie and bar charts, zooming, panning and rotation, all achieved using English-language commands.

Being device independant, PGL is as happy with input from digitizers, light pens or cursor keys for selecting from menus, defining polygons and painting pictures.

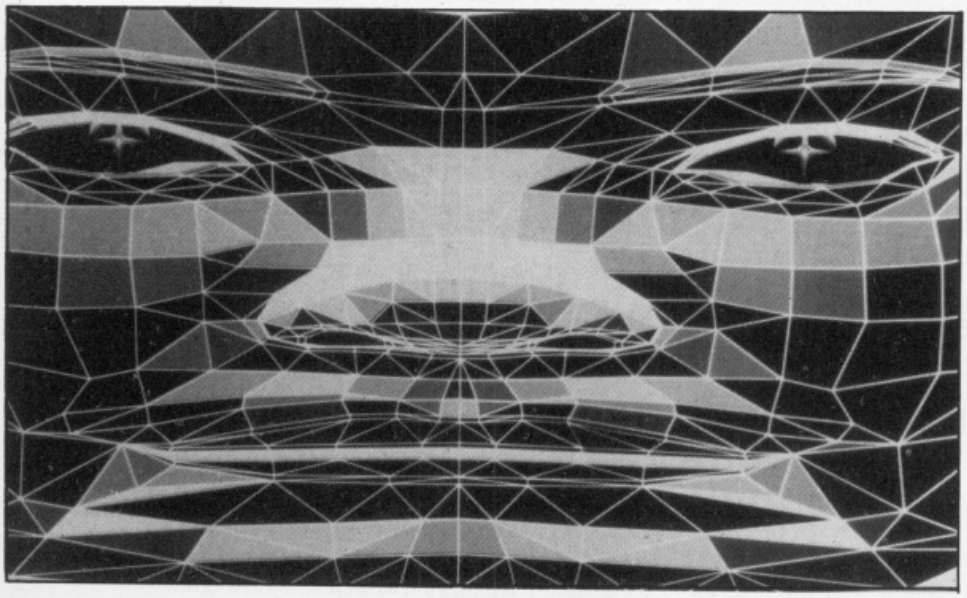
Similarly it will drive a variety of output devices including Hewlett-Packard HP-GL series plotters, Epson printers and any PLOT-10 compatible CRT.

What clever lads they are!



by Julian Allason

Allason altercation with Admiral



A quiet word in your ear about Walt Disney's *Tron*. Ignore the film critics, incorrigible technophobic fogies to a man (or in the case of the Daily Mail, a woman).

Tron is magic. And I say that despite having viewed it under rather trying circumstances (if you must know, I became involved in an altercation with the doorman of the Odeon, Leicester Square). The computer graphics are quite the best I have ever seen, and Jessica, who programmeth not, claimed to have no difficulty following the plot.

I will concede the old fogie's one point, however. A knowledge of computers *is* an asset, though not essential. If only to appreciate the jokes. I took with me Philip Burton's excellent new *Dictionary of MiniComputers and Microcomputing* (pub. Wiley £15) and needed it hardly at all.

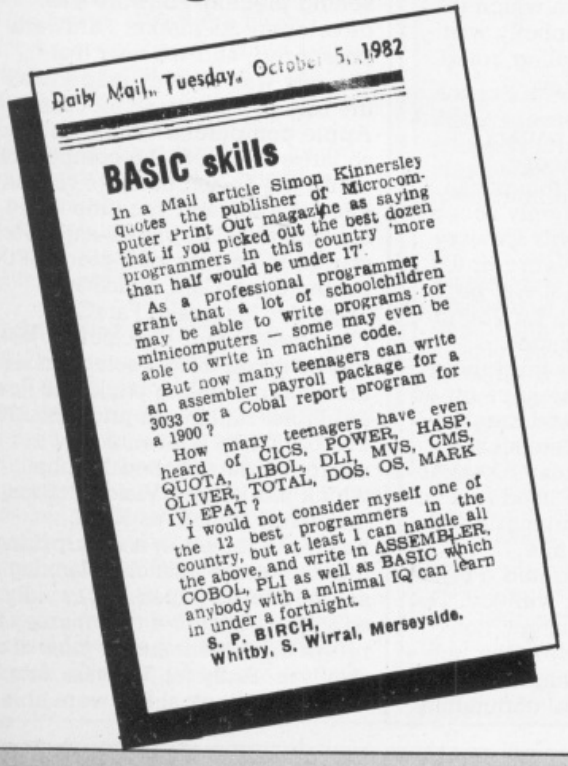
Look at *Tron* in the dictionary and you find '(Noun). Joke at expense of non-technical persons. Also Tronic (adj.)'

Nice one, Philip.

The best joke in the film concerns *Pacman*. So subtle is it that the Editor only got it the second time around. One of our solid sterling silver Space Invader badges awaits the first reader to spot it.

Meanwhile, if you are up Leicester Square way, watch out for a goon dressed like an admiral.

Multi-lingual menace



Daily Mail, Tuesday, October 5, 1982

BASIC skills

In a Mail article Simon Kinnersley quotes the publisher of Microcomputer Print Out magazine as saying that if you picked out the best dozen programmers in this country 'more than half would be under 17'.

As a professional programmer I grant that a lot of schoolchildren may be able to write programs for minicomputers — some may even be able to write in machine code.

But now many teenagers can write an assembler payroll package for a 3033 or a Cobal report program for a 1900?

How many teenagers have even heard of CICS, POWER, HASP, QUOTA, LIBOL, DLI, MVS, CMS, OLIVER, TOTAL, DOS, OS, MARK IV, EPAT?

I would not consider myself one of the 12 best programmers in the country, but at least I can handle all the above, and write in ASSEMBLER, COBOL, PL1 as well as BASIC which anybody with a minimal IQ can learn in under a fortnight.

S. P. BIRCH,
Whitby, S. Wirral, Merseyside.

This column's sunny disposition enables it to pass severely over jibes about BASIC.

But to be challenged on the subject of computer languages – that is another matter.

How, we wonder, is Mr. Birch's PASCAL? Is he fluent in FORTH? Familiar with FIFTH? Can he rustle up a little ALGOL before tea?

Is he *au fait* with such specialist applications languages as SNOBOL (Meterology), LISP (Ballet dancing), VANDOL (Sociology) and LIBOL (Journalism)?

Perchance he has encountered the German Military dialects DONR and BLTZN? And how is his DONK (*That is quite enough of that! – Ed*).

One of our celebrated sterling silver space invader badges awaits the reader submitting the most bizzare collection of computer languages. So let's be hearing from you!

Did you hear about GOOL for grave diggers, or MOTEL for lovers? Then there is STARK for nudists, WAGON for alcoholics....

Christmas Cheers!

It being the reason of merry festive cheer, not to mention a good deal of merry festive breathalyzing here-abouts, this column has been much exercised with the compilation of its christmas list.

It started well enough, with a merry blue pencil for the Editor, his being worn out. Tommy is to receive his usual tankerload of Ruddles strong and cloudy, for Inside Trader, I think some merry vitriol to dip his pen in. But what on earth does one give the wife?

The proposed quelquechoses lacy and frilly were not well-received, nor yet the suggestion of a BBC model A. Commodore's VIC *Pacman*, the source of such legal logistics just now, was similarly rejected. We may have to settle for a surprise...

The Art Editor will receive something artistic. A pink bow-tie, perhaps. But of Terry Hope, our sole contributor of taste and discernment, what?

"Something for the lavatory – he spends enough time there" was the helpful suggestion of our publisher, Robin Webb, who will be receiving a stopwatch, the better to time his observations.

In the end, I did get Terry something for the smallest room in his house: *Beyond the Tingle Quotient* by the Sunday Times' amiable columnist, Godfrey Smith, published by Wiedenfeld at £5.95.

I am aure Godfrey won't be offended by my description of it as quite the best loo-book there is. There is not much about micros in it, but judge the flavour from the following excerpt:

> Three professors were quarrelling about whose language was the most beautiful, using as their test case **butterfly, farfalla** and **papillon**, when a German professor broke in brusquely with: "Und was ist los mit *schmetterling?*"

If anyone out there is making up their list, I would love an Atari 800...

Happy Christmas!

Spreadsheet modelling is probably one of the most cost effective applications of a microcomputer – and the programs such as Visicalc and its many imitators have dominated the bestselling software lists. But modelling does not just apply to financial planning: and with a little imagination you can apply it to most areas of your business – with profitable results. **Graham Tuppen** explains how.

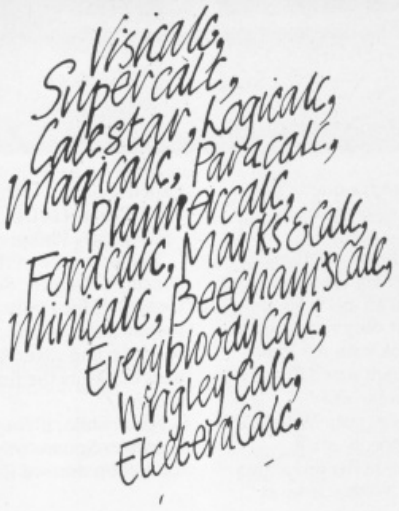
MAKING THE MOST OF YOUR SPREADSHEET

The Birth of Financial Modelling

Modelling suffered a difficult childhood—born into a family of economists, it was immediately expected to apply its as yet undeveloped logic to solving the problems posed by national (even international) economies. Given that its immediate ancestors were themselves responsible for many of the problems that currently existed, it was sad that modelling could do little better at its first attempt than MV = PT. This simple statement has something to do with the volume of money in the economy and its velocity of circulation being in some form of direct relation to prices and something else, and was clearly the infantile stumbling of the intellectually inadequate child. With the exception of the U.K. Treasury and a certain former American film star, the world ignored this economic model, and the family tree suffered yet another dent in its already tarnished image.

Throughout its lonely and abused childhood therefore, modelling sought a saviour, a knight on a white charger or perhaps even a P.R. executive to rescue it from its world of academics and economists. Modelling needed someone to promote its image as a friendly, likeable, even useful fellow of more real value to the world than had hitherto been suggested by its academic ancestors.

Software Arts, ridden by Dan Bricklin and Bob Frankston, galloped out of the western sunset (an unusual entry!!) and in 1979 Visicalc was born. Modelling was



suddenly able explain itself, and Software Arts provided it with an electronic worksheet on which to display its powers. Simplicity was the keyword and modelling could be described in just a few sentences:

An electronic piece of paper consisting of 16000 slots or coordinates into which things can be put. These slots will only accept three things. The first two are very straightforward: feed a word or a number into a slot, and it will be displayed on the screen for you to look at, print out or change whenever you like. The third thing is a bit trickier but is the juicy bit on the skeleton of words and numbers presented above. Mathematical formulae. Yes, simple mathematical formulae which can be used to interrelate ANY of the numeric slots in almost any way you like.

Accountants were delighted. Project analysts were delirious with joy. The remainder of the population, not privileged enough to wear the pin-striped uniform of the higher echelons of the financial community, moved slowly away—disappointed that this much heralded breakthrough in the world of personal computing was not theirs to share. However, the image producers clearly knew best and modelling was enthusiastically adopted by the financial planners and analysts of this world, and Software Arts became very large, and Dan Bricklin was able to buy a very smart car with the registration number "Visicar".

The Look Alikes Appear

As Visicalc became the fastest selling piece of software ever developed, its mother hardware prospered, and we hear that Visicalc was directly responsible for the sale of very many thousands of Apple computers. With the market so large and rich, the competition could not be expected to remain idle for long, and soon the uncle, aunts, nieces, nephews and cousins started to appear for a piece of the action. SuperCalc, CalcStar, Logicalc, Magicalc, ParaCalc, PlannerCalc and Visicalc are just a few selected from a selection sixty financial modelling packages now available, ranging in price for £30 to £16000. There is even a microcomputer called Prophet which has its own Visicalc clone, permantly built in as ROM.

Everyone joined in and surprisingly the market for financial planning seemed to be expanding rapidly enough to ensure a reasonable return on investment for most of the relatives. Sadly for Software Arts, most of the look alikes were able to

identify and improve upon faults in the original Visicalc, so successive generations have seen a significant improvement in performance. Somehow, I think that VisiCorp have made so much money from this original idea that they do not really mind.

Use Your Imagination

Now you are probably wondering why I made such a fuss about modelling having such a miserable family life and then being saddled with unfortunate prefix "financial". The point that I would now like to make is that the first step towards "Getting more out of your Spreadsheet" is to forget the words "financial planning" and think quite clearly about what modelling is, at its most fundamental level. Is it not simply the manipulation of words and numbers to achieve a desired result? And is this not a task undertaken by almost every member of the adult working community, perhaps several times a day, whenever he or she picks up a pen, paper and calculator? There is no doubt whatsoever that modelling is inordinately useful when planning for the future. When the likely outcome of an almost infinite series of options can be studied at the press of a button. However, we must not ignore those repetitive calculations, often involving historic data, which are ideal applications for modelling.
Let us examine some examples of the more unusual sorts of applications.

Pricing and Estimating

Some businesses are lucky enough to sell items which can be accurately priced in advance so that the request for a cost estimate requires no more than a brief inspection of a price list. Many more however are faced with lengthy and repetitive calculations before any estimate can be issued.
A double glazing contractor, for example, may need to price special size windows based upon variable types of glass supplied at X pounds

HOW DOES A SPREADSHEET WORK?

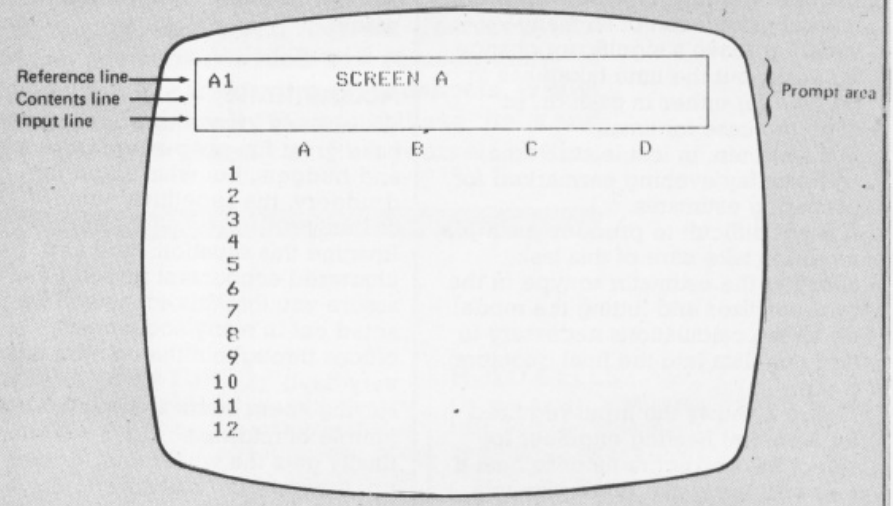


Figure 1

A typical spreadsheet program will display part of a large matrix of cells which can contain words, numbers or formulae. Each cell is referred to by a letter and nubmer e.g. A1 or C12.

A spreadsheet program is essentially a matrix of some 16,000 cells or fields, arranged in rows and columns. The columns are designated by a letter, the rows by numbers.

The VDU of screen allows you to look at any bit of this huge matrix, and your whereabouts may be defined by the co-ordinates of the slot in which you are sitting. If you can find Lombard Street by looking up a page reference and co-ordinates in a London A-Z, you will be able to find your way around the matrix. Entering words and numbers is easy — simply press the right keys. Enter anything that resembles a mathematical formula and the spreadsheet will do its best to evaluate it.
For example:

	A	B	(ENTRY)
1	LENGTH	100	100
2	BREADTH	20	20
3	AREA	2000	B1 × B2

Having entered B1 × B2 in cell B3, you have asked the spreadsheet to calculate the answer to your simple formula, saying take the number in B1 and multiply it by the number in B2. The key to the whole thing is that if we should now change the number in B1 to something else, say 133, the formula in B3 will be re-evaluated and instantly display the new answer, 2660.
That is really all there is to it. The formulae can usually be up to about 128 characters long, almost any mathematical symbol and interrelate, in any order, any of the co-ordinates in the matrix. IF functions, automatic MAXIMUM and MIMIMUM selection, instant NET PRESENT VALUES and many other features ensure that the scope for mathematical gymnastics is virtually limitless.

per square metre fitted into a framing material charged at Y pounds per foot. Add to that variable fitting items for different window sizes, at different rates for ground floor and first floor, plus travelling time plus many other variables, and already the mathematics of the project have become weighty. Not only does the manual calculation of so many variables leave a significant chance for error, but the time taken has to be paid for either in cash or, so often the case for small businessmen, in lost leisure time, with Sunday evening earmarked for preparing estimates.

It is not difficult to produce a simple model to take care of this task, allowing the estimator to type in the relevant sizes and letting the model do all the calculations necessary to turn this data into the final quotation price.

Figure 2 shows the input required for a central heating engineer to select the correct radiator to heat a four-wall room of a given size to a required temperature.

Key in the length of each wall, the temperatures on either side of each wall, "U" factors, the number and area of windows and the height of the room. Instantly the model will carry out all the calculations necessary to work out the BTU required to heat the room, and can select and display those radiators known to give a BTU output of that level. At approximately two minutes per room, such a model can save a heating engineer many hours per week.

Accountants

We already know that accountants have great fun preparing forecasts and budgets, but what about the drudgery, the repetitive number crunching.

Imagine this situation: (and as a chartered accountant myself I can assure you that this scene will be acted out in many accountants' offices throughout the country this very day!)

Having spent hours analysing a jumble of information an accountant finally gets the whole thing added up, transfers the balances to his ledgers and finally produces a set of accounts for presentation to his client. Everything has been typed and is awaiting the client who promptly spoils everything by walking in and presenting a stack of invoices that he just found in an old jacket that he has not worn for months. Head in hands, on the verge of tears, the accountant contemplates rubbing out and changing all the numbers so carefully analysed, collated, transferred to ledgers and transformed to final accounts.

Now picture the man who has built a model for this task. Columns A-Z and lines 1-200 have been used to enter all the analysis, and of course the spreadsheet can be asked to do all the adding up and checking automatically. These totals are then automatically shown over in columns AG to AR where the trial balance is lurking. Finally, way over in columns BA to BG, the rather stern and formal trial balance is transformed into a beautifully designed set of accounts, all related back to that early analysis. Now when the client comes in with his gleeful news, our friendly accountant need only enter the extra invoices and look at (and print out) the instantly revised set of accounts.

For all those accountants, in practice and in commerce, who have seen holes appear in pages of analysis paper as successive changes lead to more and more rubbing out and changing of numbers, the spreadsheet is a life-saver. Consolidations, asset records, stock valuations, management reports and many more are all ideal applications for models.

Production Planning

How pleased we always are when at last, after much manipulation of the schedules, we have squeezed all the urgent jobs into next week's production schedule, and assured at least a reasonable utilization of plant and machinery. How sad when at lunchtime on the first day two machines break down and destroy the schedule for the whole week,

```
SIZE & TEMPS OF ROOM NO:        1
         DIST      14
         TEMP      32
        !----------!
        !  U=   0.4!
DIST 13!           !DIST 11
TEMP 65!TEMP    70!TEMP 65
U=  0.3!           !U=  0.2
        !  U=   0.5!
        !----------!WINDOW AREA
         DIST      14     4 X     6
         TEMP      70 HEIGHT: 8.5
```

Figure 2

MAKING THE MOST OF YOUR

SPREADSHEET

CHOOSING YOUR SPREADSHEET

A good imagination is the best aid to increasing the performance of your spreadsheet. There are, however, certain features (not available on all modelling programs) which will remove many of the restrictions imposed by some of the earlier spreadsheets. Whilst the concept of the model is fundamentally the same, these "bells and whistles" make all the difference when you find yourself getting down to serious modelling.

VARIABLE COLUMN WIDTH

An absolute essential for any model which will be used to produce a printed report. Such reports will invariably have columns of narrative that you would like to have wider than the numeric information, and it is therefore vital that you can change individual columns to the width you require.

Where available, this will often mean that column widths can be reduced to zero characters, effectively removing from the screen or the report any intermediate, unwanted or confidential information.

ADEQUATE MODEL SIZE

Load SuperCalc into a 64K microcomputer and you will normally be left with just 27K of workable memory for modelling. Allowing for co-ordinate overheads, an average word or number may take up between 10 and 20 bytes of memory (even blank spaces use memory in most programs). All this means that a 64K machine will often allow only 1500 of the available 16000 cells to be filled before the risk of running out of memory looms large. With this in mind, make particularly sure that the modelling program that you choose gives a running indication of just how much memory you have left. There is nothing worse than spending many hours developing a sophisticated model only to find that the last line will not fit into the memory.

DISPLAY FEATURES

Remember that you will only ever be able to see a small percentage of the available 16000 slots on your screen at any one time, so make sure that your program has some good display features to let you look at the juicy bits of your model whenever you like. Visicalc and Supercalc offer split screen, double-window facilities to enable you to show two separate bits of the model at the same time. Prophet Plan has gone further: providing the split screen by means of fixed titles, *plus* the facility to display any line or column in the screen in any order required, (i.e., the top left corner of a model might display lines 1, 83, 156, 17, 200, 53, 2, etc.). *Plus* a four screen facility to let you flick directly to four different places in the model at the press of a button.

DE-BUGGING

Models, just like programs, may need debugging, and it is important to be able to see the formula underlying every cell.

Further help is given by those programs which offer the facility to print out a listing of the formulae contained in each cell, and to print the model with or without its column and row designation. Once again, with only a small part of the model on view at any one time, it is very useful to be able to see the whole thing printed out with the co-ordinates of each cell clearly marked.

HOLD CELLS

Once a model is built you want to ensure that you, in a moment of passion, or perhaps a less experienced colleague practicing on your model, does not write over a laboriously constructed formula in any of the cells. To this end the facility of protecting or holding a cell is useful.

SCREEN EDITING

There are few people in this world with the ability to conceive their model in advance or the patience to plan the entire matrix on paper before getting going. In most of us the urge to start pressing the keys is fairly strong, and with this in mind, ensure that your program has adequate screen editing facilities.

Above all, make sure that you can insert and delete lines and columns at your leisure, because you will surely think of additional things that you want to include in your model.

PRE-BUILT MODELS

It surprises me that only a very few companies have developed this market. A pre-built model, easily modified by the user thanks to the flexibility of modelling, avoids the need to re-invent the wheel for every model ever built and provides the basic framework to launch the first time user directly into some useful and often sophisticated modelling.

leaving the production controller in a panic and of course far too busy to produce a revised schedule. How easy it is to produce a model which simply requires the input of available machine hours, job numbers and time required, and where the instantly calculated output is a print out showing how machines can best be utilized to achieve the required production schedule.

And Many More.....

Pricing cuts of meat based on the weight and cost of the carcass, calculating gear ratios based on racing car aerodynamics, getting the best and most wooden planks from a tree trunk. All of these are applications for modelling.

In conclusion, then, modelling is extremely easy to learn and there are a number of powerful programs available to run on a full range or machines. The basic concept has little to do with forecasting and financial planning—they are simply one of many ends, the means of achieving which are supplied by the spreadsheet. Think of modelling as the manipulation of words and numbers, and let your imagination enlarge the boundaries of your modelling skills.

A FEW FINAL HINTS

- Always keep your input data in one area, and try to avoid any numbers in the model itself. Even if you think that you will never want to change a number leave it in the data section and refer to it using formulae in your model
- When entering data, make sure that the lines go in the same directions (i.e. rows or columns) as the section of the model where the number will be used. This makes copying (or replicating formulae) significantly easier.
- Build your model gradually on the screen, making sure each bit works as you go along, building in check digits wherever possible to ensure that your formulae are accurate. most large and sophisticated models are simply a series of smaller interlinking models, and ther are much easier to build if conceived in this way.

GAMES

DAVID PRITCHARD CONTEMPLATES COMPUTER GAMES

I PICKED UP this mouth-organ thing, and the editor said "3K".
"Pardon?" I queried.
"Extra memory," he explained, "some games need it. Just shove it in the back of the computer.
"Well, we've all got to learn sometime, haven't we?

But having now sampled a number of games, I am not sure that I'm quite ready for the home computer revolution anyway. Before you write me off as a reactionary or something, let me explain.

Speaking from the depths of a week's experience, I would classify the cheap software as falling into two categories, the hand-and-eye-and-sometimes-ear arcade-type games and the game-type games of the chess and draughts variety.

There's not too much you can say about arcade games, is there? They can be summed up in a word: mayhem. Sooner or later (sooner in my case) you are clobbered, chomped, drilled, atomised or otherwise eliminated. That is not to say that they are not fun. I've been a *Space Invaders* fanatic since the Flood (my favourite machine is still miraculously in service at my insistence: the landlord values my custom). So far I've not found a game to match it, although I've had quite a bit of fun with *Spiders of Mars* (Vic Pack VP 014). The graphics are graphic and the species insecta is a deal more attractive – even when they're plugging you – than those amorphous aliens. Basically, I suppose, if you're good at one of these games you're not too bad at the others and you certainly don't want to hear about me being massacred in the maze or liquidated on the ladder. So let's turn to the game-type games.

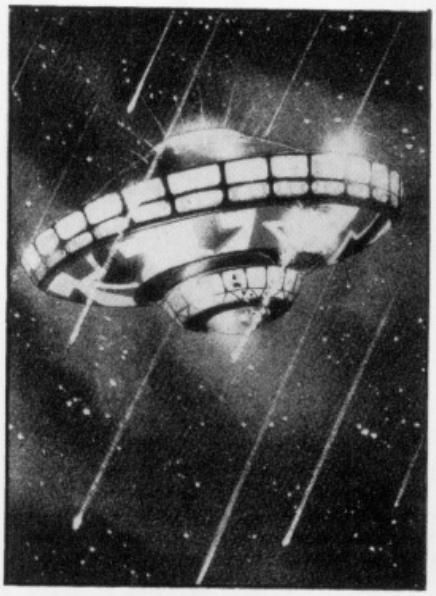
Master Class

As yet, only a few of the more popular games are readily available. All that I've tried, play at quite a reasonable standard, which is what you ask of them, though none approach master class despite some pretentious claims.

I've been looking at a game called *Renaissance* (Vic Pack VP049). The packaging is attractively designed around a picture of a couple of medieval characters in (presumably) Renaissance dress playing the board game, ('In those days players had to make their own boards and counters'). The story line starts "Once upon a time, many centuries ago..."

Inside we are told *Renaissance* is a computerised version of the proprietary game *Othello*. Just to put the record straight, *Othello* (*Renaissance*), with two very minor modifications, is the Victorian game of Reversi, invented in 1888, a year or two, you

GAMES



Which perhaps leads on to the questions: in which direction are computer games going and what can we expect in tomorrow's shops?

will observe, after the Renaissance ended. That said, the program is a sound one, with play at eight levels and all the usual facilities to change sides, take moves back, record games and so on. Recommended.

I also enjoyed a backgammon game (Bug Byte Software: 3K expansion required) which played well. A nine-hole golf game however (VP 055) was not so satisfactory. I simply could not see the ball because the contrast between it and the course was inadequate. It may be more realistic that way, but I found intelligent play impossible. A feature I liked about the game was the random element fed in – representing, no doubt, the wind, your rheumatism and the other uncertainties that intrude on any round of golf – which ensures that every game is different even though the course is unchanged and you select the same clubs. Not really my cup of tee, you could say – but then I'm not a golfer.

Confusing Designs

Contrast does seem to be a failing in several of these games. No serious chessplayer would consider playing with one of the fancy moulded-resin sets now on the market because the designs are confusing and instant recognition of the physical elements of a game is essential for concentration. Similarly, the attraction of colour seems to have blinded some software manufacturers to the need to keep the elements of a strategy game clean, clear and in contrast – even if this does mean using largely black and white. Keep the magentas and aquamarines for the titles, please!

I hope I have made clear that I've been talking about the cheaper cartridge and cassette games, not the more elaborate and fairly expensive adventure games that are becoming increasingly popular; a knock-on, one suspects, from the *Dungeons & Dragons* craze.

Which perhaps leads on to the questions: in which direction are computer games going and what can we expect in tomorrow's shops? The usual answer to this sort of question is: what the manufacturers care to dish up – which may be quite a long way from what you and I want.

And what do we want? Well, I don't know what you want, but I would like to think it's what I want. For a start, there must be almost unlimited scope for making the hand-and-eye games more attractive. I don't know enough about electronics to appreciate the technical problems that may have to be overcome so perhaps I'm a little naive to suggest a scenario for the sort of game that would appeal to me. But that won't stop me.

Strategy games have a long way to go, too. Games like chess and backgammon can certainly be improved, even if it is only making the programs a little stronger.

The player would be the pilot of an aeroplane or helicopter flying low over jungle and mountains beset by the usual hazards (electric storms, peaks embedded in mist, Coca-Cola cans thrown by the natives), scoring points by dropping, say, food or medical supplies in small clearings or on cliff ledges. Title: Mercy Mission. It would be a change from the endless slaughter, anyway. And you can do better than that! I thought it up in two minutes flat.

Strategy Games

Strategy games have a long way to go, too. Games like chess and backgammon can certainly be improved, even if it is only making the programs a little stronger. But I am not so concerned about these. I find it ironic that the games that are freely available are precisely those in which I have little difficulty in finding a human opponent (and let's be honest, human opponents are more interesting than CRTs).

Adventure games, as far as I can see, can progress without limit, unless that limit is a purse.

The games I would like to see in software are those for which opponents are hard to find – Shogi, Xiangqi, Lasca, Fanorona. A minority taste, I hear you say? Perhaps. But again, if cassettes for these games became available, I think they would attract quite a lot of buyers. You might opt for The Dwarf Apes of Jupiter rather than Wari, the West African form of Mancala – an easy game to portray and program, and a fascinating game to play – but enough would be tempted, I believe, to make the experiment worth some manufacturer's investment. And talking of Mancala, did you know that this is a game which a computer can be taught to play *perfectly*?

Adventure games, as far as I can see, can progress without limit, unless that limit is a purse. But there is one type of game that is beyond the reach of home computers and is likely to remain so for quite some time; the multi-player game.

You simply can't have a battery of screens and terminals and consoles and joysticks spread all over the living-room even if you have got room to stuff the computer in – and without personal controls, how are you going to keep your cards hidden, for instance? No, if you want your £10 from each of the other players because you have won second prize in a beauty contest, there is no alternative to raiding the games cupboard.

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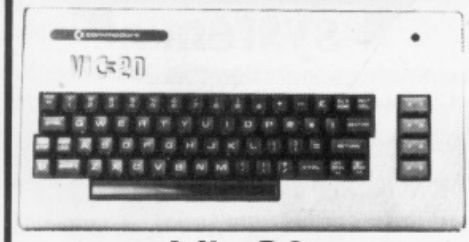

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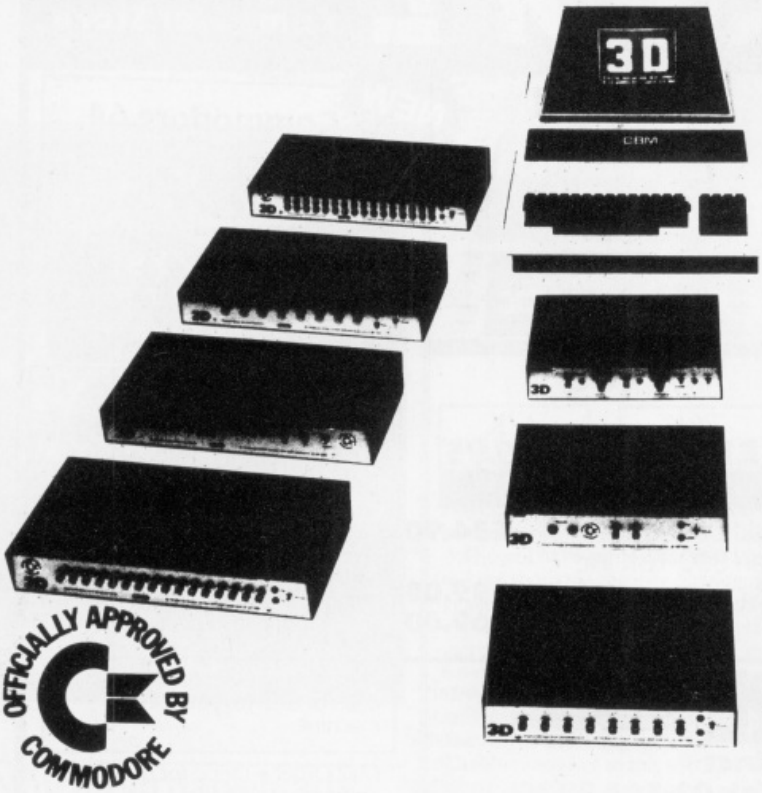

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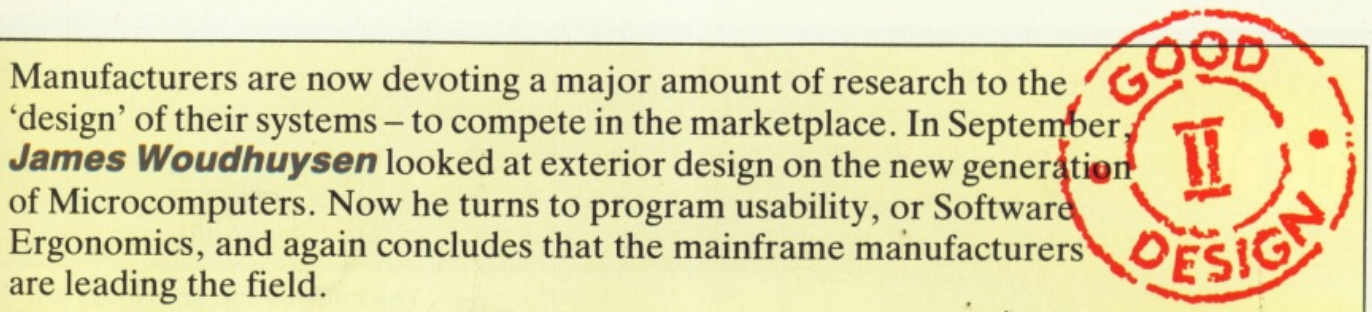
Manufacturers are now devoting a major amount of research to the 'design' of their systems – to compete in the marketplace. In September, ***James Woudhuysen*** looked at exterior design on the new generation of Microcomputers. Now he turns to program usability, or Software Ergonomics, and again concludes that the mainframe manufacturers are leading the field.



SOFTWARE

In praise of 'good manners'

Ergonomics, the study of how man reacts to machines, is fast climbing up computer companies' lists of research priorities. ITT Europe now holds international conferences to discuss it; IBM UK's laboratories at Hursley, near Portsmouth, are taking on more specialists in it. Meanwhile, a quarterly journal with the formidable title *Behaviour and Information Technology* (Taylor & Francis, £34 a year) has started finding its way on to the shelves of university libraries, and the National Electronics Council is about to publish a report recommending that makers and users of information technology look at all its ergonomics aspects much more closely.

In a previous article ('Good design: a look at the ergonomics on micros', *MicroComputer Printout*, September 1982, page 48), I suggested that, while mainframe manufacturers had largely solved the physical, hardware-based ergonomics problems associated with their machines, many micro manufacturers still had a long way to go to bring the design of their products up to scratch. In the field of software ergonomics, however, the situation is more interesting. To wit: the invention of the microcomputer was a major breakthrough in 'user-friendliness' – the whole idea of one-man-one-machine made computers much more acceptable to non-computer people, and did away with many of the complex operating procedures associated with mainframe time-sharing. Further, now that computers were to be used by the man in the street, their operation had to be greatly simplified. The irony is, however, that it is the mainframe manufacturers, with their vast resources and research departments, who are *now* leading the field in software ergonomics – spurred on by the need to compete in the massive new micro market!

The little book that gets lost

First, a note about a subject which isn't strictly to do with software in the true sense of the term, but which has more to do with it than terminal design: instruction manuals. Now, a detailed survey of the manuals that go with today's micros will have to await another issue of *MicroComputer Printout*. But this much is clear: putting a manual together is an art.

Manuals continue to be written by people whose intimate association with the development of the product they are trying to describe renders them unable to see it from the user's point of view – and unwilling to test user reactions, too. This is why some users

SOFTWARE

GOOD DESIGN

only find out how to switch their machines on once they guess that turning up the page number next to the words *Security Keylock* in their manual's index will lead them to the relevant instuctions. Simple phrases like *On/Off* seem to elude many manual writers.

The fact, however, that basic blunders like this still abound does not mean that clarity of exposition and layout in manuals is simply a matter of correcting a few trivial errors. To get somebody new to micros even to pick up a manual can be difficult, given how daunting one can look; and to prevent them from dropping it in exasperation a few minutes later can be next to impossible (it's not surprising, either, that many manuals get lost), especially when they're small and badly produced, which is often the case. Still there are some rules to be followed (see box).

Words,words...

Being interactive in a way that manuals are not, computer software presents a rather different set of problems – although both simply-written manuals and simply-written software appeal as much to professionals as they do to amateurs. Perhaps the most basic law is "that to err is human: computers must forgive". Thus, a program that flashed up the words

INCORRECT COMMAND

every time the user makes an everyday slip, like putting two spaces between a pair of words instead of one, is a program that is both unfair and intimidatory (note that capitals are always more frightening than lower case). On the other hand, a program that greets the entry,

September 35, 1982

with the reply,

I Think You've Made A Mistake.
You've Entered September 35:
Which Date In September Did You Have In Mind?

is friendlier and genuinely helpful.

As for a program able to convert your micro into a London Underground route indicator, or one that could come back on the transposed, abbreviated and four times mis-spelt entry,

Cetn Clphhem

with

I imagine you meant Central Clapham.
I'm afraid there's no such station.
There's (1) Clapham North
(2) Clapham Common
(3) Clapham South
Please enter the number of the station you want ( )

would be a pleasure to work with (though might raise your expectations a bit high!).

Software ergonomics is not just about forgiving human errors. The design of a program must also take into account the number of people likely to make use of it and the relative sophistication of their backgrounds.

Naturally, too, the design of a program has to reflect the intrinsic complexity of the ideas it is trying to get across. Lastly, program design has to guard against errors – particularly when the consequences of these can be dangerous. It makes sense to arrange for the words

WARNING:
Do you really wish to proceed with this course of action?

to be flashed up in order to avoid processing delays or irretrievable loss of data.

HOW TO SPOT A GOOD INSTRUCTION MANUAL

You should be able to master it quickly

A manual should have a title so that you can talk about it with ease. The title, a one-sentence explanatory subtitle, and the date should all be on the front cover. Thus,

The MagiMicro manual

Everything you ever wanted to know about Clobberdoor's best microcomputer.

November 1982

There should be a contents on page three, (pages in your manual should be numbered clearly).
A good contents page will look something like this:

Contents	Page
How to set it up	5
How to use it	10
How to look after it	15
What to do if it ever goes wrong	20
Further information	25
Appendix A: The story of MagiMicro	30
Appendix B: Future MagiMicro Development	35
Quick Reference Index	40

PLEASE NOTE:
This instruction manual is for use with the *Clobberdoor MagiMicro* only.

Information should be presented in the right order

As soon as you get through the contents page, presuming you want to start at the beginning rather than resort to the index pages straight away, you should be told exactly what you need to know next, what you need to know next, and so on. Each step in the argument should be numbered.

Late information which, directly or indirectly, contradicts, qualifies or amends earlier instructions is a hassle. So is early information which you're forced to return to at a later stage and which, in the meantime, gets in the way of the information which you really need at that point. It should be possible to cut a straight path, with no loops and dead ends.

The information should be in a form which suits its purpose

You should be able to read your manual through from end to end, and at the same time use it for quick reference.

There are other 'levels' of information also: *either/or* information, which invites you to compare alternatives and make a choice; *footnote* information, which interrupts a sequence of information to make a general comment, offer advice or to give a warning; *stage direction* information, which tells you, the reader, how to use the other information.

The nature of each different level of information should be made obvious, by the choice of words, the choice of typeface, font and typesize, by the use of pictures and the nature of the layout. Examples of such choices should be on display at the front of the manual, so as to subliminally convey their significance early on in the game. Glancing at the 'PLEASE NOTE' bit underneath the Contents earlier, you've probably already got the feeling that you're going to run into this device again.

Any special terms should be defined early on, explicitly and very clearly. Pictures that show a particular product when a point about a whole family of products is being made, are a bore.

If something must be said twice, it should be said so in exactly the same way

Ideally, each piece of information should be covered once and once only. If repetition is necessary, or a 'condensed' piece of information is to be followed by a 'definitive' one later, the two should be completely consistent with each other. Same terms, form of words, heading and graphic style. Nothing put in the 'condensed' version that doesn't figure in the 'definitive' one.

Pictures should not repeat what is said in words, and vice versa. Captions should relate properly both to pictures and to the main text. The titles and labels on diagrams should tie up with the main text. Text should not be on one page and diagrams overleaf, a common error.

The manual shouldn't try too hard

The second person *"You will find that"* rather than *"It will be found that"*, imperatives *"Turn to page xx for more information on"* and contractions, *Don't* rather than *Do not* are all useful. But they can be overdone. The same goes for 'stage directions', *"Cut out this page and keep it with your..."*

A good manual gets you from ignorance to understanding fast, and includes the information which is vital but which is usually left out. How do I unpack the thing? Can I transport it with ease? What do my guarantee warranty and 'free demonstration' cards mean, and what should I do with them? What fuse should I put in the plug? Can I repair any of my micro myself, and who do I get in touch with when it goes wrong? What are the manufacturer's office hours? These are questions that everybody asks but nobody answers.

Most of today's program designs have one or more of the following faults.

- **Poor language.** Instructions should be short, straight and polite. Jargon jars. For instance, at the moment users of different micros sign-off on-screen with words like *Logoff* and *Quit*, which is silly. A language should be compact, but powerful and not make too many demands on its user's memory.

- **Poor user orientation**. It helps for a micro to say what it's doing, either continuously or at the press of a key. Examples are,

I'm working on your instruction
Please wait a minute

or, on word processors, the display of tabs, margins, line lengths, and the typeface, size and font currently in use (plus the alternatives, if possible). It also helps to present courses of action in the form of alphabetical *Menus*. These should be suitably titled, for instance, *London Underground Station Menu*, and have the items on them numbered, and be completed by a simple *Prompt*, such as,

Please enter the number of the station you want again

- **Poor consistency.** Information like

I'm working on your instruction

or messages to say you have made a mistake, should be given special screen positions of their own – and those positions should not change. The method behind abbreviation should also be a consistent one.

- **Poor user assistance.** When the user enters *Help* he should get lots of it and fast. The only qualification to this, is that assistance routines should be flexible enough to allow advanced users to take short-cuts through them. Likewise, every input should evoke a *Prompt* – and prompts should be followed by *Entry formats*, that is, details of how to make the next entry. Thus, on an intelligent ticket machine, the entry

Clapham South

should elicit

What type of ticket do you need?
(Single/day return/child)

- **Poor automation and poor flexibility.** It ought to be easy to get through a program quickly: unnecessary inputting should be avoided. In addition, there ought to be a number of different synonyms available for some words, and several ways of achieving similar programming goals. Each varient should have its own advantages in terms of suitability to a particular operator's skills and needs.

- **Redundancy.** Synonyms and alternative ways of programming should not be provided for their own sake, or they will prove redundant in use.

- **Poor reliability.** The information a computer presents should be comprehensive, accurate, and capable of only one interpretation.

- **Poor corrigibility.** It should be easy to correct mistakes. Word processors, for example, should allow their users' to store the pieces of text they delete.

...Icons, icons

Some of the biggest present day advances in program design are embodied on Xerox's 8010 Star Information System. On the Star, the user can pick the objects that go to make up his office (blank paper, pads of forms, documents, document files, in-trays, out-trays, printers, etc) and have them represented as little one-inch square 'icons' on screen. The screen than becomes a miniature desktop on which icons can be physically shifted about by use of a cursor and a simple *Move* key. Needless to say, each icon can be 'opened' to reveal its contents; these are displayed in the accessible form of a 'window' that temporarily occupies most of the screen.

The point about the Star is that it is extremely realistic. Working with it is very similar to working in an office. The Star takes advantage of the fact that most people think spatially; and it also allows its users to juggle a lot of ideas simultaneously, and without having to commit too many to memory. But the Star approach can be taken still further. Sponsored by the US Department of Defence, the Architecture Machine Group at MIT, Boston, is researching computer/user interfaces in which icons – which include maps, a calendar, a calculator, a telephone, videodiscs, movies and so on – are projected on a 13-foot screen and 'navigated' around by means of a joystick-

SOFTWARE GOOD II DESIGN

and-window device or by addressing an NEC DP-100 Connected Speech Recogniser with Verbal commands.

Navigating over to the fixed calendar tells the Recogniser to prepare to hear further commands with words like *Saturday* in them, and not to bother listening out for calculator commands like *Subtract* (and not to confuse *Saturday* with the like-sounding instruction *Add on eight* either). In addition, the user can summon up simple graphical devices by oral command *Make a large green circle* and manipulate them by an adroit mix of oral instruction *Put that there* and pointing with the aid of an on-screen cursor hooked up to sensors attached to the user's wrist.

Lastly, spectacles which track the movement of the user's cornea by infra red (cost: $10,000) allow icons to be selected to within an accuracy of 3° simply by looking at them. With this set-up, it is a simple matter to arrange for icons to be magnified once they're looked at for long enough.

DIRECTIONS FOR FUTURE RESEARCH

Ultimately, MIT's experiments in software ergonomics could lead to 'media rooms' supplanting terminals, and to users turning into something akin to orchestra conductors or air traffic controllers. But, given that media rooms will probably only ever be available to the most high-powered office executives, and given that the Star costs £15,000 to buy, where does that leave software ergonomics on everyday micros?

The answer is that just for micro manufacturers to follow the guidelines set out above would be a major step forward. In addition, however, there are a number of ergonomics areas which truly progressive micro manufacturers ought to research for themselves. Here they are.

Three-way dialogues between the professional user, his computer and his customer throw up up ergonomics condundrums of their own. When, for instance, a doctor uses a micro in front of a patient, ergonomics is a subtle blend of eye contact, physical proximity, nervousness and reassurance. A data processing delay of 10 seconds, say, might be tolerable for the doctor on his own; but a patient can find it a nail-biting experience in a surgery. These kinds of problems deserve analysis.

Recovery from and anxiety about errors requires further investigation. When users make an error, they often try to get round the problem by repeating the routine they just followed to see if and when they made a mistake – or in the hopes that their micro will 'get it right this time'. Here, careful scrutiny of user reactions could improve program design considerably.

Word processor formatting could be a lot better. Word processors should range words left and sums right; they should put decimal points in a vertical line; and they should allow their users to 'scroll' up and down and from side to side at variable speeds (better still, they shoud have a variable-speed 'page-turning' system). All these features already exist on micros; but there are other refinements to be made. At present, for example, there are a number of different ways of inserting sentences in the middle of a piece of text, but none of them are really satisfactory. Both overtyping and moving the text that follows an insertion off-screen can leave the user lost. A word processor that reformats continuously – that is, those which take the text that follows an insertion and move it on one letterspace for every character inserted – are by far the easiest to use.

Voice recognition and speech synthesis need to be more fully understood. Recognition involves the use of lip mikes, interference from background noise, psychological problems (addressing machines as people) and – of course – operator error (IBM has found that untrained speakers get tired earlier than untrained typists, and that they make just as many mistakes). Synthesis involves mute switches, headphones, accents, tone deafness and a lot else besides. Mixing one with the other, or with visual displays, is a whole new ballgame.

Now, you might say that micro manufacturers don't have the research on psychological problems (three-way dialogues, error routines), and that they don't have the ability to make major technological improvements (such as the addition of speech interfaces) without passing on unacceptable price rises to users. But, as I argued about hardware ergonomics on micros, users should – and undoubtedly *will* – demand better software ergonomics from manufacturers. Sooner or later, micro firms are bound to realise that good manners pay.

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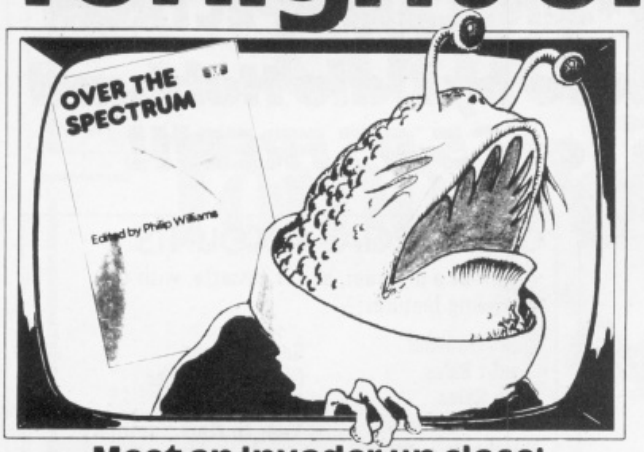

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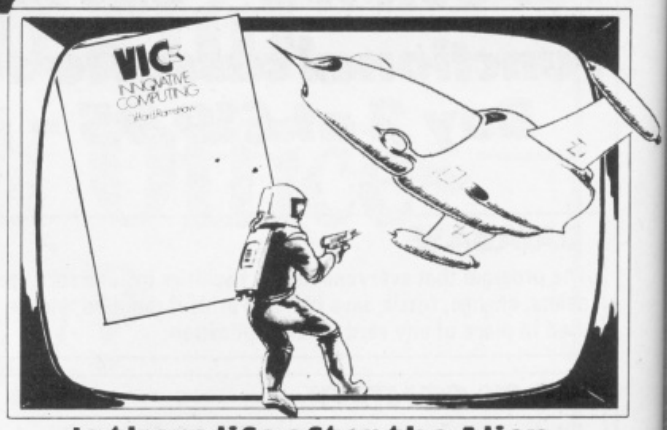

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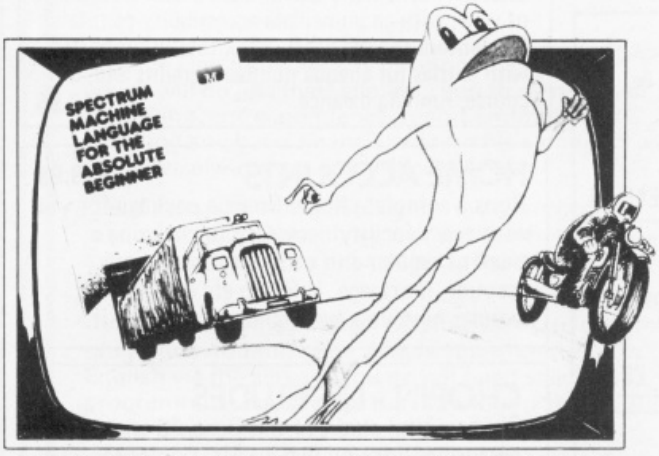

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TEXAS INSTRUMENTS

HOME TO BUSINESS

What can you learn about Business computing with your Home micro?

By Charles Christian

Once upon a time, and it was not all that long ago, the world of computing was a pretty straightforward place to live in. There were massive mainframe computers like the one in the film "The Billion Dollar Brain", taking up whole buildings; and there were minicomputers, each one of which could be mistaken from a distance for a convention of deep-freezers. Inevitably both had to live in special controlled environments. And they were strictly off-limits to mere mortals like you or me – indeed they usually needed whole teams of highly paid operators and programmers to get anything out of them.

Then, about six or seven years ago, this whole cosy duopoly was turned upside down by the arrival on the scene of the microprocessor or – to use a hackneyed cliche – the advent of the ubiquitous silicon chip. Suddenly we were all living in the age of the personal computer, with initially, Commodore, Apple and Tandy all battling for honours in the marketplace.

Compared with the standards of today, some of these early models were pretty primitive – grotty little "break your finger nails off" keyboards; poor resolution graphics; miniscule internal RAM memories; a complete lack of useful peripherals such as even a modest printer; and an entirely inadequate tape-cassette recorder supplying back-up memory, if you were lucky. Still it was a beginning and in a very short time it had stimulated the development of a thriving microcomputer software market with both games and serious business applications becoming available.

HOME TO BUSINESS

Big Versus Small

In time both the sophistication of the software and the hardware began to improve, but as this happened so a change came over the personal computer market.

At one end there was the emergence of the professional business system with a big internal memory; high resolution graphics; large and highly efficient data storage on floppy disk, and more recently Winchester hard disk; a fast daisy-wheel type printer; and a capability for taking on all sorts of other tasks, such as data transmission. Armed with the well written software packages that are now available, these systems – for which you can expect to pay anything from between £3,000 to £6,000 – really are thoroughbred business computers, which have literally transformed the way some organisations run. But, whilst all this has been going on, there have also been changes taking place at the other end of the market, with the same developments in technology being used to enhance what rapidly became known as the home computer. Atari, for example, have utilised bigger memories and higher resolution colour graphics to produce what must be the ultimate in television-games machines – the Atari 800 – which allows you to play "Pac-Man" or "Asteroids" just as well as in an amusement arcade.

Then there is the Sinclair ZX81, which, with a 16K RAM pack, has twice the memory of the original £650 Commodore PET yet only costs £100. True, the Sinclair may only have a rudimentary keyboard and print out its hard copy on what one of my colleagues recently described in "The Times" as looking like "narrow-gauge silver toilet paper". But it certainly justifies Sinclair's advertised claim that it is "the ideal low-cost introduction to computing".

Joining Sinclair at the "bottom end" of the microcomputer market are such machines as the Acorn Atom, the Nascom 1, the Commodore VIC, and of course, the Atari. They are all legitimate microcomputers in their own right; they are cheap, and most of them have far more power than machines costing ten times as much just a few years ago. Furthermore, for anyone wanting a TV games machine for the family or for the hobbyist wanting to dabble in computing for the first time, they offer excellent value for money

The Thin End Of The Wedge?

But is that all they are really good for? Or is there a halfway house somewhere in the personal computer spectrum where both ends of the market – the home computers and the business machines – could meet?

The traditional scenario for the man-meets-micro-and-gets-the-computing-bug story, promulgated both by manufacturers and magazines, has tended to drive a wedge between the two markets. It is usually something on the following lines:

Mister Average – an upwardly mobile sales executive with 2.2 children, a Capri with a rear windscreen-wiper and a semi near Camberley, spots an advertisement in one of the Sunday colour suppplements for a small microcomputer.

... is there a halfway house somewhere in the personal computer spectrum where both home computers and the business machines could meet?

As the idea of playing Pac-Man with the kids in the luxury of his own home appeals to him, rather than dicing with death in seedy arcades whilst local thugs knock the stuffing out of eath other with Newcastle Brown bottles, he fills in his credit card number and sends off for one.

He is probably shrewd enough to spot the fact the if he orders a couple of cheap "business" programs as well – perhaps a personal financial management cassette and one for statistics – he might get away with putting it all down to tax as a deductible

HOME TO BUSINESS

expense on the grounds that it constitutes the purchase of "office equipment". (One word of warning, the Inland Revenue have got wise to this ruse).

After several months of successfully zapping the invaders from Mars, he decides one day to have a look at one of the more serious programs and – surprise, surprise – finds it quite interesting. "Gosh", he thinks, "I must learn more" and, after that, there is no stopping him as he wades his way through "Teach Yourself Basic" books and do-it-yourself programming cassettes.

Eventually our hobbyist, gameplaying executive metamorphoses into a fully fledged micro buff and sets about astounding his workmates and confounding his competitors by ordering an all singing, all dancing microsystem for his business.

As for his original micro? Well, that either gets traded in as part exchange for the new system, or else gets left at home to gather dust in a corner of the attic.

So much for the scenario; but is it really necessary for there to be such a rigid distinction drawn between home and business microcomputers?

In this and in following articles in *MicroComputer Printout*, I will be looking at the proposition that it is possible to move on from home to business computing by building up and generally upgrading your original hardware system, rather than trading it in for a new system once you reach a certain level of sophistication.

However, first a disclaimer; the sort of business-users I have in mind are sole-traders or partners and directors in small firms and companies. I would not dream of suggesting, as one computer manufacturer did recently, that you could enhance a home computer to such an extent that it could "do quite literally anything from playing chess to running a power station". Believe that and you will believe anything.

Features In Common

The pertinent starting point for this thesis must be the fact that there is not, nor has there ever been, any significant difference in the level of technology employed in both the home and the business microcomputer. Look inside some of the most sophisticated business microcomputers on the market and you will find one of Zilog's Z80 microprocessor chips at the heart of the system. Look inside the Sinclair ZX81, or certain versions of the Commodore 64, and you will find the selfsame chip!

Leading on from this there are other similarities. Primarily because we humans with our pudgy fingers find them so much easier to use, nearly all microcomputers nowadays (the ZX81 excepted), whether sold for business use or pleasure, feature standard typewriter-like keys. Likewise the technology that converts electronic data into a visual image is just the same whether it is appearing on an integral VDU monitor or on your own domestic television set.

Having emphasised the similarities however it would be a mistake to think that just any home computer can be turned into a business system. To begin with, because you will inevitably be wanting to expand the capabilities of the system, you will want to be able to expand its hardware configuration. And this in turn presupposes two things: firstly that the system is from both a physical and design point of view *capable* of being expanded; and secondly that "add on" hardware is *actually* available for you to buy.

> ... there is not any significant difference in the level of technology employed in both the home and the business microcomputer.

By way of a qualification to this, it is also worth remembering that with a lot of small businesses – particularly one-man-bands – a home computer may give them all the computing power they actually need. A home computer can make a super programmable calculator, and if that is all you need and you have no intention of using it for book-keeping or correspondence, then there is little point in investing in floppy disk systems or high quality printers. Never upgrade a system just for the sake of it or because you want to have all the latest gadgets – that is just a waste of time, effort and money.

On a rather pessimistic note, it is also worth considering that your experiments with computing could just turn out to be a disaster. Either you just cannot get the hang of it, or there seems to be no useful way in which you can incorporate it into your business.

Before buying a home computer you intend expanding, you should therefore find out just what it has in the way of interface ports and whether there are any restraints on expansion. For serious business use you are going to need at least three things A printer to produce hard copy. A floppy disk drive – because a cassette is far too slow and restricted in storage capacity to be of any practical use,

> In a nutshell, you are looking for a home computer that can be upgraded into a business system.

(loading a program from a cassette can take 10 minutes or more, with a floppy disk it is almost instantaneous). And some form of add-on memory – a 16K machine that can hold 16,000 characters of information may sound very impressive, but it is really not all that great when you consider that something as straight-forward as "Visicalc", the financial planning program, takes up 23,000 characters of memory. Consequently for serious business use 32K of memory must be seen as a minimum, and 48K preferable.

As to whether it is actually available, the problem here is that all too often a manufacturer's much vaunted peripherals turn out to be nothing more than a figment of a catalogue illustrator's fevered imagination. Frequently, the announcement of the launch of new equipment is made prematurely, whilst technical problems still remain or before a company can cope with manufacturing to meet large orders. People still waiting for their BBC Micros or their Sinclair Spectrum's will understand precisely this problem...

In a nutshell, if you are looking for a home computer that can be upgraded into a business system, you need to know what is available here and now, not what may be available at sometime in the dim and distant future.

Why Follow The Expansion Path?

It is of course one thing to argue that it is technically possible to start with a certain type of home computer and then upgrade it. But a rather different matter is whether it is actually desirable to follow what could be called the expansion path to business computing. There would however seem to be a number of advantages to such a course of action:

To begin with, by starting with home computing, whether for entertainment or educational purposes, you are letting yourself into the world of computing very gently, rather than jumping in at the deep-end. Although it is a ghastly phrase that does little credit to the English language, there does seem to be a phenomenon called "techno-fear" whereby quite intelligent people develop a mental block and are unable to operate pieces of new high technology equipment such as computers.

So, rather than being publicly humiliated in your own office, or having some oily salesman sneering at you, whenever you accidentally foul-up the system, with a home computer

you can become familiar with its ways and hopefully master it in the peace and comfort of your own home. And at your own pace.
A second point to consider is that to opt immediately for a fully-fledged business system is, because of the cost factor, quite a major step to take. By going for a home computer first however, it is possible to start small and work your way up. And this can be particularly important if, like a lot of small businessmen, you suffer from cash-flow problems. For example, you can expect to pay in excess of £200 for a colour VDU monitor for a computer system, but by making do with your domestic television set you can immediately defer this item of expenditure.

Similarly, instead of being committed to the purchase of a lot of memory and at least two floppy disk drives – as you would be with a business system – a home computer enables you to build up memory in easy stages (the Commodore VIC for example has 3K, 8K and 16K plug-in memory packs), or to upgrade from cassette to single floppy and then to dual floppy.
Whatever the reason, your unfortunate experience will be a far less costly one if it only involved a home computer. Far better to waste £500 on a home computer, which at least can always be used by the kids as a games machine, than waste £5,000 on a business system that is no use to man or beast.

Now Is The Hour

Many of the comments that have been made so far in this article would remain equally true whether they were said now or at any time over the last couple of years. But recently there have been a number of developments which tend to indicate that if you are intending to go for the home-to-business computing option, now is the time to do it.

There is, what can best be described as a new generation of home computers coming onto the market. The Atari, for example, now has a full range of professional peripherals, like a disk drive, available for it; the 16K expandable to 48K Sinclair ZX Spectrum will soon be available with 'microdrive' storage; and Commodore have just launched their "64" model which, as well has having 64K of memory and featuring nearly everything but the kitchen sink, is about half the price of what seems to be its nearest rival, the Apple II, which has long been regarded as a serious basic business machine.

These new generation machines also emphasise another reason why now would be an appropriate time to invest in a hobby computer, for the software trade that supplies them seems to be coming of age. Initially for some systems, games packages were the only software programs available – and only on tape cassette at that. Now there are comprehensive business software libraries becoming available, both on disk and cassette, for nearly all hardware systems. In this respect the Commodore 64 deserves a special mention, for as well as programs written specifically for it, existing programs for the VIC and the PET can be easily converted to work on it and, a special second processor option gives it the ability to support the CP/M operating system, making an estimated 1,000 further software packages available.

If the Commodore 64 represents the shape of personal computing things to come, then the present distinction between home and business computers must surely start to whither away.

If the Commodore 64 represents the shape of personal computing things to come, the present distinction between home and business computers must surely start to whither away.

Finally.....

To sum up: increasingly comparable technology and software, a more relaxed learning environment, a smaller financial commitment and altogether far less at stake if anything goes wrong, all add up to some powerful reasons why serious consideration should be given to the idea of moving on from home computing to business computing through gradually upgrading a system. Just how this very fine sounding theory works out in practice, we will start to discover next month when I report back on my experiences with some real hardware and software.

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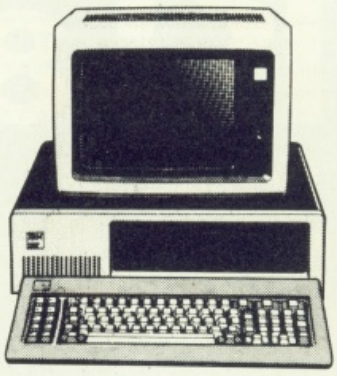

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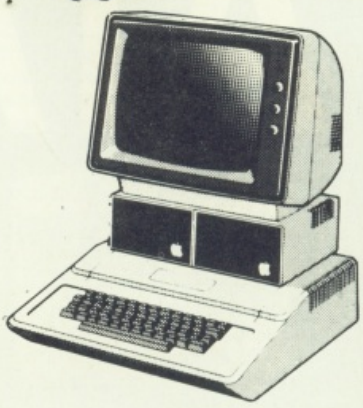

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A TEST CASE

Micro mastery might boost your business but your family wants a home computer. Can you combine both? And how hard is it?
***Terry Hope* reports.**

You're reading this magazine and that means you're affected (and maybe have been for some time) by the enormous increase of interest in computing. And there *is* an enormous increase.

You know it. Worse, your family knows it (that's your fault for having a bright partner and smart kids!), and they're hassling you to put them at the leading edge of technology too. You, canny person that you are, are wondering whether you can combine business with pleasure and acquire a machine that'll be equally at home in both spheres.

I'm going to show you how at least one relatively low-cost micro *will* be of real help for relatively modest business requirements, while being unarguably ideal in the home environment.

At home in your Business?

Taking the home requirement first, Atari is an obvious choice, but could it possibly be a business machine too? Surely it's great for games, but would it really be any good for more commercial pursuits?

With the arrival of several serious software packages specifically designed for Atari (and the imminence of others) the answer's 'yes'. In fact, if you look carefully round you'll be interested and maybe surprised to find that Atari's almost the *only* popular micro with the software to make it ideal for home and small business alike.

Best of all, with a combined business and pleasure machine, you've no need to leap in at the deep end in terms of immediate commercial use. You'll need time to learn your machine. What better way to do that than in your own home, at your own speed, in your own way, having fun while you're doing it!

The remainder of this article will tell you about some of the business/serious software that's available right now or will be very soon; what you'll need in the way of equipment; how much the software and the equipment will cost; what they'll do for your business (and your family); and what problems you may run into along the way.

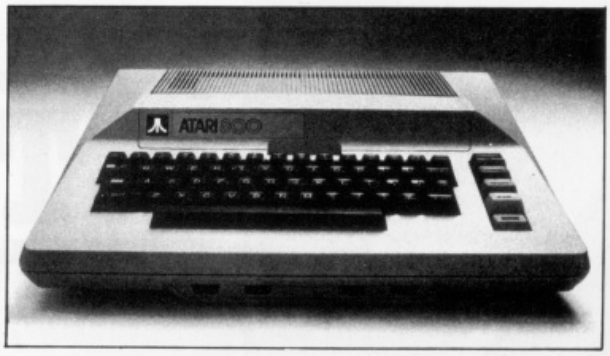
All the information is based on my own experience. I learnt the hard and sometimes expensive way – what you'll read here should make sure your learning process won't be the same!

BASIC BUSINESS SOFTWARE

The Bare Minimum

When I say "basic business software", I mean just that: the barest minimum consistent with positively helping a *small* business. That means doing things more quickly and cost-effectively. It doesn't mean whopping great payroll packages, incredible inventory control, superb stock and supply systems, and so on. It doesn't even mean the most wonderful word processing package and the darndest database bundle ever.

It does mean a word processing package and a database system for starters though. The reasoning's simple and it's the continuous theme through this article: what do you need as a basic minimum to be genuinely useful in the small business *and* in the home, bearing in mind that the latter is where much of the learning process for a beginner to the computing game is going to occur. What's efficient, effective, economic and easy for a beginner in this dual environment? Hopefully, I'll supply some answers!



Word Processing

First, word processing. What will it do and why do you need it? I'm covering the basic essentials briefly because the day before yesterday I phoned 12 friends who all run small businesses. I asked them all the same question: "Can you tell me what word processing is?" and not one was really sure. Several said they'd read a lot of complicated stuff about it but weren't any the wiser. That irritates me. Lots of writers who should know better come on with advanced prose descriptions, and forget that most of what they say is going right past the people to whom they're saying it.

Now that's off my chest, let me answer the question. Word processing is using your computer to get fast and perfect text, all neatly typed, without errors or bits you'd like to rephrase but for all the extra work involved.

How does it work? Simple. A computer program lets you type on the keyboard and see the words on the screen. Then it lets you move them, change them, delete them, add to them, or do any messing around which might improve the whole. Nothing's printed at this stage – it all happens on the screen. When you're satisfied, you do two things: store your text, usually on disk, so that it's always available; and print it on paper. And it's perfect because you did all your fiddling while it was only on the screen.

So what's all the word processing fuss about? That's simple too: the more facilities there are to move, change, delete, add, and otherwise mess around, the better the system is supposed to be. I think that's debatable. It could just as easily be argued that large numbers of facilities also make things harder to learn and gererally more complicated. Coming back to our domestic cum small business usage, however, I'd contend that a word processor was one of the two basic nescessities.

Atari's well-served in that respect and you'll find details of currently available word processors elsewhere in this article.

Databases

Now what's all this about database programs? Better, what is a database? Hundreds of thousands of words have been written about them. This magazine carried major articles on them. One appeared only last month and very good it was too. But did you read it right through and feel it applied to *you*? If the answer's "yes", skip the rest of this article – it's not for you.

> The 400 will cost you about £199 and the 800 about £499 ... why should they be separated by a £300 gap?

I'd like to come at databases from a rather more simplistic point of view. After all, the aim is to get you using one, not deciding the whole concept is far beyond your needs and maybe even understanding. So how's this for simple analogy? Do you have a telephone? Yes? Even Better. How do you remember all their numbers? With a telephone index of some sort? Terrific – you're using a database!

Because that's all a database is: a collection of facts that are related in some way. A *Computer* database is different in only a few ways – it tends to have a lot more facts in it than your telephone index, and you can get at the facts you want pretty quickly.

Since I'd like to avoid being beaten round the head by database fanatics, let me quickly point out that I said a computer database lets you get at the *facts* you want. That's another significant advantage: a large collection of facts in a database can be examined, compared, rejected or selected by the computer, according to criteria you choose. If your database has 1,000 names and addresses in it, and you want to know all the Smiths who aren't named Fred but who do live in Maidenhead but not in Acacia Avenue, it'll tell you. Quickly too.

It'll do the same for your wife's recipes or your childrens' record collection or your books. It's just as useful at home as in the office.

Really good databases will even do calculations as data is being entered or later. Thus if you've got a complete set of facts on all the things you sell, and the VAT rate changes (pray God!), then your database will recalculate all the necessary figures on command. Useful, eh?

Once again Atari is well-served from the database viewpoint, and you'll find details of what you can get elsewhere in this article.

The Computer

The computer is the heart of your choice. Let's assume you've checked and that you have indeed found Atari is one of the only micros which has serious business software available, as well as loads of more light-hearted programs.

On that basis, you've two models available: the Atari 400 and the Atari 800. The 400 will cost you about £199 and the 800 about £499 (I'm quoting the officical list prices including VAT but be sure to shop around; you may well find the 400 and the 800 at slightly lower figures).

Do make sure that VAT is included in the prices you see. There are still those who put the non-VAT price in big bold type with "Please add 15% for VAT" in teeny letters somewhere else in the advertisement. It's a pernicious habit in my view but it happens, so watch out for it.

There are some differences between the 400 and the 800 but none that make any great difference to their computing performance. Why then should they be separated by a £300 gap? Let's look first at the physical differences.

Membrane Keyboards. Ugh?

The major visible one is the keyboard. The 400 has a "membrane" keyboard, while the 800 has a keyboard with keys. Both are laid out in the familiar typewriter style, but the 400's "keyboard" has the "keys" embossed on it. The 800 has keys which are identical to those on a typewriter.

There'll be those who, perhaps seized with memories of the Sinclair ZX80 or ZX81, will recoil from the idea of a membrane keyboard. If you're one then try the 400's keyboard before you make up your mind. It has a tactile feel to it; the "keys" are embossed rather than simply printed on; a very light touch is all that's needed to operate them; and there's an audible "click" when each key is touched. I can actually touch-type on the 400 but it'll be you that's using it so it must be your decision!

The other differences? You'll have to buy Atari's Basic language cartridge as an extra for the 400; it's included in the £499 price tag for the 800. Though some software doesn't need the Basic cartridge, you'll need it to do any computing of your own. Since it costs £50 (complete with Atari's excellent manuals), this effectively reduces the difference between the 400 and the 800 to about £245 or so.

Both come with the same amount of immediately available memory (16K in exact terms; it's the space in which you do your computing) so the question is therefore whether the 800 has anything else going for it which makes it worth nearly twice as much as the 400?

The 800 is probably nicer to look at. It has video and audio outputs in addition to a lead for straight connection to the nearest TV, which the 400 also has.

Can You Expand?

The 800 has two slots (against the 400's one) into which programming language, game or other cartridges plug. Almost all available cartridges plug into the left-hand slot. There are few so far available for the slot on the right. Does the extra slot justify the price difference?

At this point, we're may be getting closer to the heart of the matter. Atari are a shrewd organisation and I suspect the right-hand slot isn't there by accident. There'll almost certainly be plans for it buried deep in Atari's Sunnyvale HQ in California.

When (or if) those plans and right-hand slot cartridges surface, one thing's for sure: 400 owners won't be able to take advantage of them. It may or may not be important, but it's something to bear in mind.

What other differences are there? The answer really is central: 800 owners can easily expand their available memory to at least 48K by simply plugging in extra memory modules. The 400's memory can be expanded too but it wasn't designed that way. Thus the 400 has to be physically opened and an expansion memory board inserted. Memory boards are available and the fitting isn't difficult but that's not the point.

The key fact is that the 800 has been designed to get bigger if the user wants; the 400 hasn't. Thus the 800's memory slots can take other things besides memory modules. It's not in the scope of this article to discuss them. Sufficient to say that because of the 800's intrinsic differences it merits serious consideration if you think you'll get serious about computing.

SAVING AND LOADING PROGRAMS

A cassette may or may not require more memory... a disk unit will certainly require an extra 16K for it's operating needs.

Saving Programs on Tape

The one essential thing you'll need is something to "save" programs you write yourself and "load" programs you buy ready-written.

You'll need a cassette recorder/player for tape. It must be the Atari unit because its been designed to let the computer turn it on and off. It also has the near-unique advantage of being able to play pre-recorded voice or music through your TV while the program is running – invaluable for educational programs. The Atari cassette unit costs about £49 and operates with the 400 or the 800 computers.

Saving Programs on Disk

Disks need a disk drive – a sophisticated piece of machinery hence its higher price – around £299 for the Atari drive. Disks have several very significant advantages over tape, not the least of which is that quite a lot of ready-written programs are/may only be available on disk.

There's one disadvantage to the Atari disk drive apart from the higher investment: it requires the computer to have more memory than it has when it comes out of the packing box. If you don't add this memory, there won't be enough to run any but the tiniest programs!

A disk drive therefore means more memory – realistically an additional 32K to make a maximum of 48K. This comes in two 16K plug-in modules priced at £65 each.

Because it's possible to add memory to the 400 too, a disk drive will work with either the 400 or the 800. I've not mentioned the price of memory boards for the 400 because they vary pretty widely according to size and quality.

Summarising Storage

Let's summarise the question of extra memory. A cassette unit may or may not require more memory. It depends only on the length of the program you want to load. The cassette unit itself doesn't demand memory to operate.

A disk unit will certainly require an extra 16K for it's operating needs, to make 32K total, and you may require an extra 32K, according to program length, to make 48K total.

Thus on the one hand we have a £50 cassette unit and on the other we have a disk drive which, with extra memory, could involve us in £429. It sounds like "no contest" but think about what you *eventually* want to do with your computer before you make your mind up.

We're assuming throughout that you're going to use it, however partially, for business. You'll get familiar with it at home – maybe even develop some of those business applications there – and then start using it in your office. If that's so, you'll probably acquire fairly sophisticated ready-written software (see the sections in this article on "Word Processing" and "Data Bases").

This won't be available on cassette which means that, though you may only go as far as a cassette unit and 16K memory at the start, you'll want a disk drive (or even drives) plus more memory eventually.

This *could* affect which Atari – the 400 or the 800 – you choose. That's why we're mentioning it now.

PRINTERS AND PRINTING

What Sort? What Size?

The last thing to consider is whether you're going to have a printer and if so, which one.

For normal home computing, you may not want one, though it's useful for program listings from time to time. If that's as far as you plan to go, the Atari 822 thermal printer will be fine. It costs around £198. However, for business use (and utilitarian home use too), a more versatile printer is a "must" and nothing less than 80-column will do.

80-column? Sorry about the "computerese"! All it means is the maximum width the printer will handle. An 80-column printer lets you print a maximum of 80 characters in one line, which is sufficient for most business applications.

If you're thinking about an 80-column (or wider) printer, there's one essential item to think about first – the Atari 850 Interface Module. This is a flat box of boring appearance which goes between the computer and some peripherals, including the larger printers. It quietly does a multitude of essential tasks; in our present context, it lets a dialogue occur between computer and printer.

It's not needed for the small thermal unit (which plugs straight into the computer) but bigger printers are totally dependent on it. The 850 Interface Module costs £135 and that needs to be added to the cost of whatever printer you might decide to have.

If that makes you pale slightly, remember the 850 will do a lot of other things too. None will be immediately useful to you, but it's helpful to know your £150 will eventually let you do a lot more than connect a printer!

The Great Atari Printer Mystery

But which printer? It's a good question. Not too long ago the Atari 825 80-column printer mysteriously disappeared from the catalogues, apparently leaving Atari owners without the possibility of moving up to, or acquiring outright, an Atari-brand machine.

However, all was not as it originally seemed, for the Atari 825 was, in fact, a Centronics 737 printer in disguise. The model supplied for a time in the UK was the Centronics 739, an up-dated 737. It was a fairly versatile if slightly noisy machine with a considerable range of typestyles and other options under program control.

These included a good proportional typeface (one where the letters occupy different widths – thus the "m" is a lot wider than the "i") which came very close to letter-quality. Effectively this means you probably wouldn't be worried about using it to write to your bank manager!

The UK-supplied Atari 825 (or Centronics 739 – same thing) cost just under £540, so of all the items you might buy, it was the most expensive. The ultimate cost was, of course, round about £685 with the Interface Module included.

Gone Without Trace!

For some reason now though, Atari have dropped an 80-column printer. It's vanished as if it had never been. This effectively means they've dropped Centronics. This is very odd because the Atari Word Processor (see the "word processor" section elsewhere in this article) is specially designed to work with the Centronics printer and effectively only the Centronics printer. Thus Atari are marketing a £100 Word Processor without a printer to go with it!

Why have Atari dropped the Centronics printer? I've no idea but it gives food for thought if you're thinking about buying one. The Centronics 739 is still available, and Centronics (a large American firm, originally known for their pioneering work in printers for micros) have a big place in Burgess Hill, Sussex.

I've been told of rather bizarre and frustrating incidents connected with Centronics service and service charges (chapter and verse will be supplied if Centronics are interested), so that may be something else to bear in mind when you consider what printer to get for your Atari.

So What's The Choice?

What other printers are there? Another six or seven different makes is the answer, so Atari users aren't without a considerable choice (compare that with some other leading micros!)

Once again, sorry, but it's not within the scope of this article to look *in depth* at every one available. We'll do that some time soon. What we can do is mention at least two of the printers and leave it to you to have a closer look at them.

There's a reason for our choice of the two printers and it's a very important reason: there's business, graphics and home software on sale right now for the Atari which has been *specifically* designed to operate with these two makes of printer. That's important – there's little point in having a printer if there's no software which recognises its characteristics!

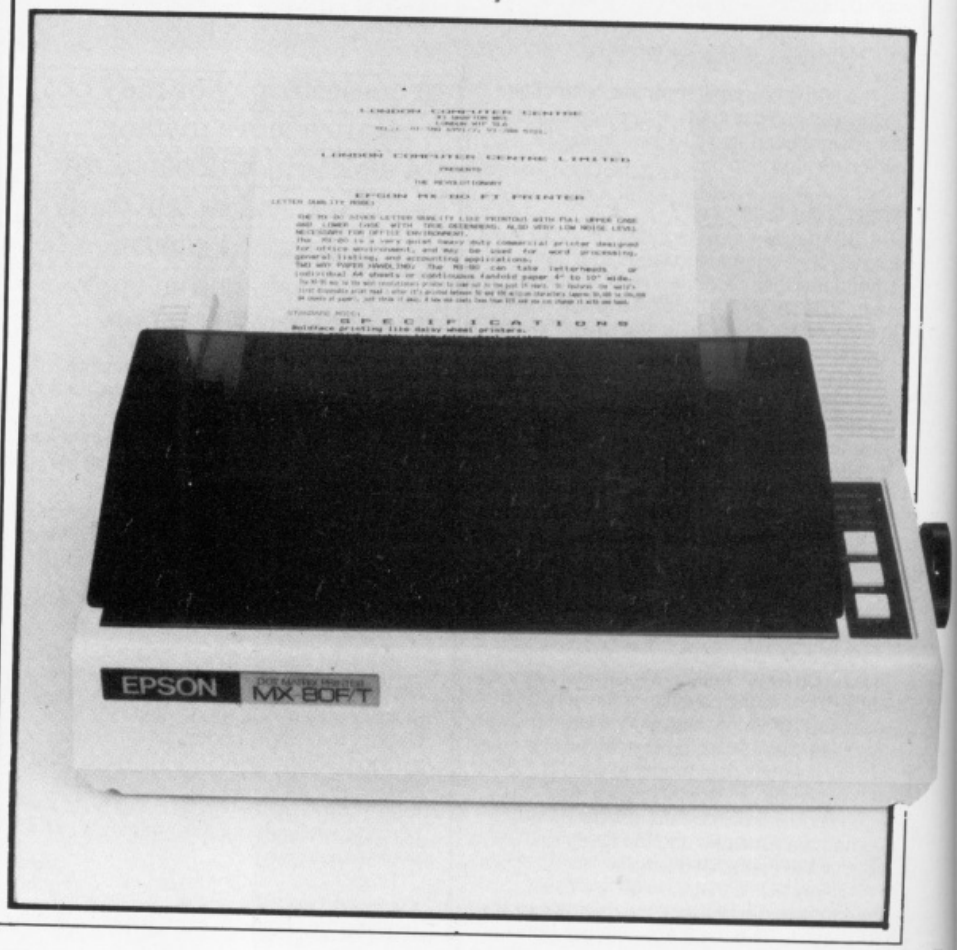
> ... for business use, nothing less than 80-column will do.

The Epson Printer

The first and most obvious (because they're so well-established and have so many models) is the Epson printer. It's inexpensive, performs beautifully, has lots of features not found in printers costing more, and represents value for money. It doesn't have a proportional typeface but otherwise it has a lot going for it. The MX-80 will cost you between £343 and £385 according to whether you only want to use continuous computer paper or single sheets as well from time to time (and you might, for letters and suchlike). One word of caution: if you choose an Epson, make sure it's a Type III, the latest model. There are still quite a few earlier models floating about.

The NEC Printer

The next is the NEC 8023A which is also a very nice printer. It seemed to us to be just a mite less sturdily built than the Epson, but this was probably only a result of the top cover which flexed very slightly when being removed or replaced. It's not something to worry about. The NEC does have a proportional typeface and it's a very good one too. The NEC wil cost you around £375.



THE COST

Let's Add it up

If you've read this far (and I hope you have – nothing worries me more than an audience getting up and leaving half way through!), you may be feeling that it's all going to be a bit too expensive. Worry not, that's a normal reaction when confronted with a mass of facts and figures.

Let's actually summarise the likely cost, based on the assumption that you'll go for an Atari 800, a disk drive, the extra memory, a printer, and probably a cassette recorder.

Atari 800 computer	499.00
Atari 810 disk drive	299.00
Additional 32K memory	130.00
Total cost so far	928.00
Atari 850 Interface Module	135.00
Epson MX-80F/T III (example)	385.25
Printer cable	25.00
Total cost so far	1583.25
Atari 410 cassette recorder	49.45
Final cost for the package	1633.70

Don't forget that the prices above include VAT. Take VAT off, as you may be able if you're buying through a business, and the cost drops to around £1325. And, of course, if you settled on the Atari 400 instead of the 800, there's another reduction of around £245 (or more if you exclude VAT).

Your Money's Invested 3 Ways

Now this isn't a small investment, of course, but don't lose sight of the fact that the whole point of the exercise was to acquire a computer that would serve a triple purpose: to provide your family with computer knowledge and use; to let you get to grips with computer technology and experiment with the best ways to use it in your business life; and to provide a computer that would be genuinely valuable in a business sphere.

On that basis, you may well think that the investment is not only justified but reasonable. Shrewd businessman that you are, you'll undoubtedly check prices and abilities and you'll find two things: few other "domestic" micros can serve such a dual purpose, mainly because the business software isn't available for them; and that few, if any, "business" micros are of much value in a purely domestic environment because they lack appropriate software and don't perform in an appropriate way.

Which leads on, naturally enough, to the business software which *is* available for the Atari.

AVAILABLE SOFTWARE

As this article is being written, there's already a significant number of sophisticated business-type packages available for the Atari. The signficance lies in the fact that they're available at all – I know I'm repeating myself, but a check on other popular "domestic" micros apparently designed for home use will demonstrate that very few have word processors *and* database software available right now.

And let's mention just once Visicalc, the world's best-selling business program. Of course it's available for the up-market machines like Apple, the big Commodores, and others in that category. For how many "domestic" micros is it available? One and one only – Atari. That single fact speaks volumes!

But let's first look at word processors and then databases. There isn't space to provide a detailed review of the facilities each has. A full article could be devoted to each one. I'll therefore give a rapid overview plus my own feelings. Remember they're *my* impressions. Though they're based on experience, things that I dislike may be loved by others!

The Atari Word Processor

The cost is £100 (£99.99 actually but we won't argue about 1p will we?) and the packaging is superb. Documentation is also consistent with Atari's incredibly high standards. It's disk based (as are virtually all word processors) and Atari thoughtfully provide a duplicate back-up disk in case the original ever gives trouble. They also provide a third disk which has recorded on it all the text used in the instruction text. This means you don't have to type it in yourself – nice touch. Also included is an audio tape on which a nice friendly-sounding American gentleman chats you through the training exercises.

I like the word manipulation abilites – you can delete things in a large number of ways. I don't like the fact that you can often do it without meaning to. There's a key that restores the lost text though, providing you're still on the same line.

I hate – though the feature is intended as an advantage – the amazing amount of time the program takes to format and paginate a document (formatting and pagination are what happens when the final size, shape and page length of a document are determined in the Atari system). Though you the the diversion of being able to watch it happen at machine-code speeds on the screen, it's incredibly time-consuming and very boring after a while.

However, leaving all other things to one side, it seems to me that the Atari Word Processor is damned entirely by the fact that Atari no longer sell a printer to go with it. A word processor without a printer is as much good as a car without wheels, and it'll go about as far too!

Datasoft's "Text Wizard"

The correct list price is £72.80 though I've seen them advertised at £99.95 (obscene – that's what it costs in dollars in the USA!) and at £69.95 (good – competition is healthy!). For that money, "Text Wizard" represents remarkable value, especially the latest versions now appearing in the shops. You get a double-sided disk and a very luxuriously bound manual. One side of the disk is intended for the Epson printer and, in the latest version of "Text Wizard", the other side is intended for the NEC printer. Earlier versions of "Text Wizard" were configured for Epson and Centronics, which tells a story!

I like the extensive use of colour round the screen border and occasionally over the whole screen to warn you of situations of which "Text Wizard" considers you need to be aware. This has meant I've never accidentally lost a word, let alone a page, of text in the many months I've been using it.

Formatting and pagination take literally no time – you do it as you go with simple codes in the text. I also like the fact that regardless of how wide my printed text is going to be, the screen text is always totally in view and therefore very easy to check for errors (Atari forces you to go through a special format process if you want to read your text without moving the whole screen "window" left or right).

Another excellent facility is the ability to change format or typestyle (printers always provide several of the latter) *anywhere* in the text – even in the middle of a line if required. This is impossible with the Atari word processor, but it's a valuable feature.

Finally, I have it on good authority that Datasoft are about to release "Spell Wizard" to link with "Text Wizard". Spelling checkers examine word processor text and highlight errors by comparing every word with an internal dictionary. "Spell Wizard" will apparently be priced at around the £55 mark, but even without it I'd rate "Text Wizard" as a very good word processing buy.

The CCA Data Management System

This American database is occasionally advertised in the UK and I have a copy (which I had sent direct from the States a long time ago when I first changed my computer to Atari) so I'll mention it briefly.

"Briefly" because I have to say that it's one of the worst databases I've ever had the misfortune to use. There are – or rather, were – many things I didn't like about it (including a numbered message system that's the heart of the database operation and which makes Atari's error messages look like a course in clear communication) but towering above all the others is one astonishing and disabling deficiency. When searching an existing database to see whether or not a particular

piece of data is there, it's necessary to indicate with great accuracy what the data is before the search can be carried out.

This is akin to mislaying your watch in the house somewhere and your wife saying, "Tell me where you mislaid it and I'll try to find it for you". The obvious reply is, "If I knew where I'd mislaid the damn thing it wouldn't be mislaid, would it?" I queried this curiosity with the American firm marketing the database but they didn't bother to reply to my letter.

I should give the CCA Data Management System a miss if I were you.

The Atari APX Data Management System

This is a very simple and straightforward database system, available from the Atari Program Exchange list. It costs £16 which is, of course, very little. At the same time, I don't think Atari will mind me saying that, nice though the program is, it isn't exactly a heavy-weight database contender. Look on it more as a mini card index.

Synapse Software's "FileManager 800+"

"FileManager 800+" costs £72.80 at the moment. I'm told there's an increase from the USA in the pipeline which will move it up to around the £89 mark, but that hasn't reached the dealers yet. It comes on a disk with a duplicate back-up on the reverse side. It's accompanied by an incredibly clear and easy to follow (as well as intentionally amusing and light-hearted) 104 page manual enclosed in a dark blue ring binder. I've used "FileManager 800+" for a long time now and, in a phrase, I love it! It's been written especially for Atari alone, and so it makes full use of all Atari's features.

It's not necessary to extol its virtues – others have done that already. Let me quote from the September 1982 issue of "Compute", a highly-respected American magazine. It carries an article about the making of "Tron", the latest Walt Disney blockbuster. This paragraph appears in the article: "All the thousands of sound effects created by the computers or collected on tape were catalogued on an Atari with FileManager 800+.....the record for any sound effect, listing its characteristics, source, and location on tape, could be retrieved in 1.5 seconds".

If that doesn't convince you, nothing will. I should add, however, that FileManager 800+ is an updated version of the original FileManager 800. The newer version has maths capability, which means it'll perform calculations on your data, an advantage I've described earlier.

Finally, the latest versions of Synapse Software's "FileManager 800+" and Datasoft's "Text Wizard" have been desgined to interface to each other. The obvious application is the production of customised direct mail letters, using the text of a letter created on "Text Wizard" with a database of names and addresses on "FileManager 800+".

A LAST WORD

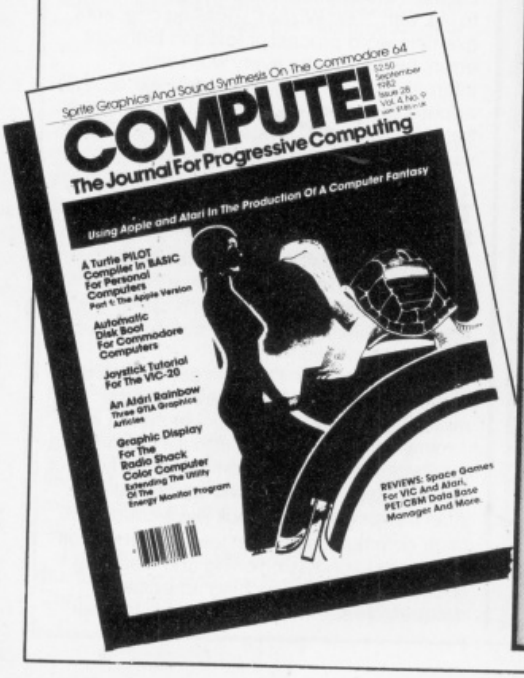
And there we are, my friends. The aim throughout has been to show those of you who may have been wondering whether it was possible to combine pleasure with business, computer-style, that it *can* be done.

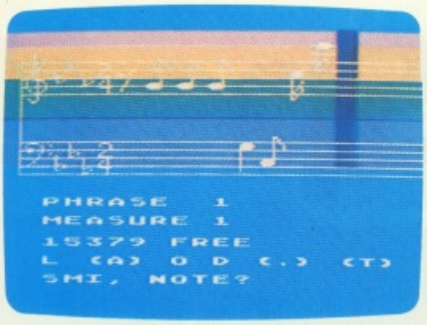
Better, all that hassle of trying to come to grips with today's technology in your business can be a pleasant affair in the peace of your own home (broken only by the kids querulously asking when they can play Pacman).

Best of all, both the home and business targets can be hit for considerably less than the price of a straightforward business computer, and you'll still have change to buy the software.

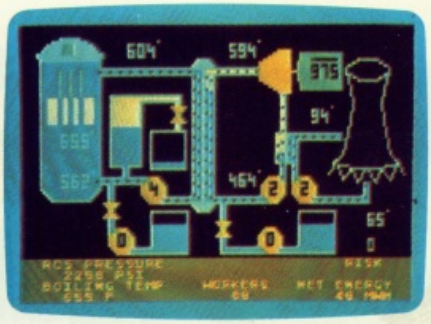
Talking of which, as a last word, I haven't mentioned the other types of package available. There are indeed payroll, stock control, bought ledger and similar software for Atari, which widens the horizons still further.

Atari themselves will never go the road trodden so firmly by Commodore (personal computer metamorphosed to business machine) because I've never known a company so determined to stay with and promote the "home computer" label. But it's nice to know that users can go down both home and business roads if they choose.


Sprite Graphics And Sound Synthesis On The Commodore 64
COMPUTE!
The Journal For Progressive Computing
Using Apple and Atari In The Production Of A Computer Fantasy
A Turtle PILOT Compiler In BASIC For Personal Computers
Automatic Disk Boot For Commodore Computers
Joystick Tutorial For The VIC-20
An Atari Rainbow
Graphic Display For The Radio Shack Color Computer
REVIEWS: Space Games For VIC And Atari, PET/CBM Data Base Manager And More.

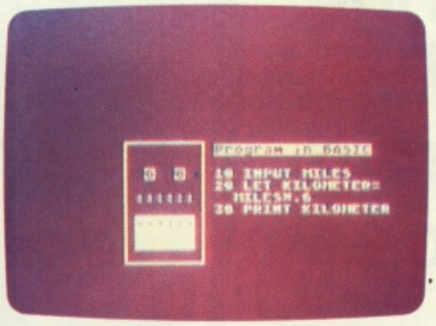


Music Composer

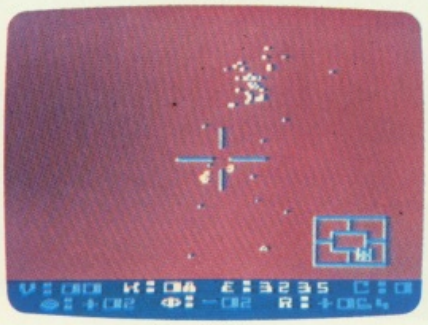


Scram

Graph-it



Intro to BASIC 1



Star Raiders

European Countries

Missile Command

Basketball

3.7 million reasons why the Atari Home Computer is something to see. The display screen used with our computers is composed of 192 horizontal lines, each containing 320 dots. Delivering colour and luminosity instructions to each dot for a second requires 3.7 million cycles...a lot of work for the normal 6502 processor.

That's why the Atari computer has equipped its 6502 with its own electronic assistant. It's called ANTIC, and it handles all the display work, leaving the 6502 free to handle the rest. What this means to you is uncompromisingly spectacular display capabilities without loss of computer power needed to carry out the demands of your program.

That's a quality you just don't find in ordinary home computers. And it's one of the reasons some computer experts say that Atari computers are so far ahead of their time.

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Sound. An Atari computer has four sound generators, or voices, activated by a separate microchip. This leaves the principal microprocessor chips free to perform other tasks. And you can take full advantage of this capability which is designed for easy programming.

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The ZX Spectrum incorporates all the proven features of the ZX81. But its new 16K BASIC ROM dramatically increases your computing power.

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You have the facility to support separate data files.

You have a choice of storage capacities (governed by the amount of RAM). 16K of RAM (which you can uprate later to 48K of RAM) or a massive 48K of RAM.

Yet the price of the Spectrum 16K is an amazing £125! Even the popular 48K version costs only £175!

You may decide to begin with the 16K version. If so, you can still return it later for an upgrade. The cost? Around £60.

Ready to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer – available now – is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232 / network interface board.

Key features of the Sinclair ZX Spectrum

- Full colour – 8 colours each for foreground, background and border, plus flashing and brightness-intensity control.
- Sound – BEEP command with variable pitch and duration.
- Massive RAM – 16K or 48K.
- Full-size moving-key keyboard – all keys at normal typewriter pitch, with repeat facility on each key.
- High-resolution – 256 dots horizontally x 192 vertically, each individually addressable for true high-resolution graphics.
- ASCII character set – with upper- and lower-case characters.
- Teletext-compatible – user software can generate 40 characters per line or other settings.
- High speed LOAD & SAVE – 16K in 100 seconds via cassette, with VERIFY & MERGE for programs and separate data files.
- Sinclair 16K extended BASIC – incorporating unique 'one-touch' keyword entry, syntax check, and report codes.

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ZX Spectrum software on cassettes – available now

The first 21 software cassettes are now available directly from Sinclair. Produced by ICL and Psion, subjects include games, education, and business/household management. Galactic Invasion... Flight Simulation... Chess... History... Inventions... VU-CALC... VU-3D ...47 programs in all. There's something for everyone, and they all make full use of the Spectrum's colour, sound and graphics capabilities. You'll receive a detailed catalogue with your Spectrum.

RS232/network interface board

This interface, available later this year, will enable you to connect your ZX Spectrum to a whole host of printers, terminals and other computers.

The potential is enormous. And the astonishingly low price of only £20 is possible only because the operating systems are already designed into the ROM.

sinclair

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey GU15 3PS.
Tel: Camberley (0276) 685311.

The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

The ZX Microdrive – coming soon

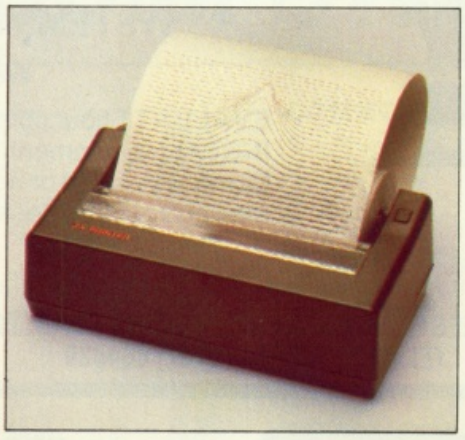
The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing.

Each Microdrive is capable of holding up to 100K bytes using a single interchangeable microfloppy.

The transfer rate is 16K bytes per second, with average access time of 3.5 seconds. And you'll be able to connect up to 8 ZX Microdrives to your ZX Spectrum.

All the BASIC commands required for the Microdrives are included on the Spectrum.

A remarkable breakthrough at a remarkable price. The Microdrives are available later this year, for around £50.



How to order your ZX Spectrum

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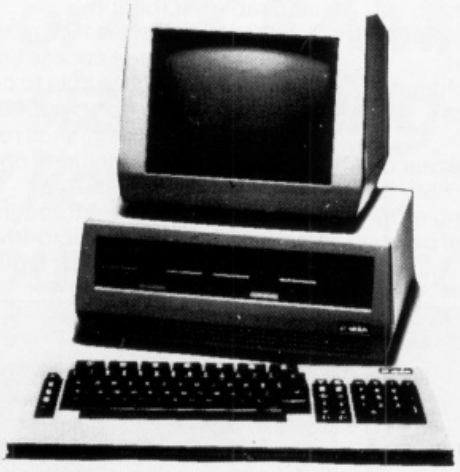

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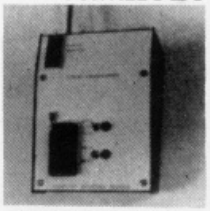

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:1008 4C 08 A0 60 00 00 00 00
:1010          Flashing cursor
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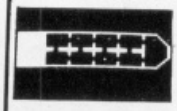

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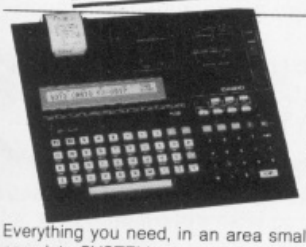

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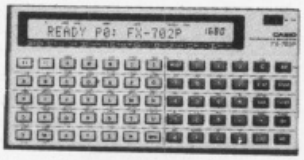

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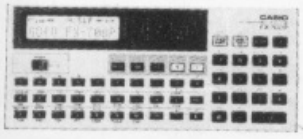

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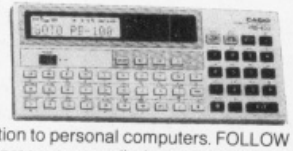

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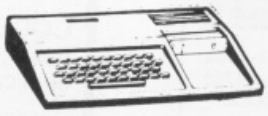

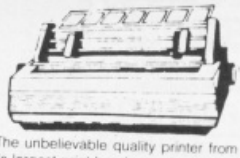

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TOMMY'S TIPS

Programming Problems Solved

Time Please

Dear Tommy,
In the June '82 issue you give a program for measuring reaction times in milliseconds rather than jiffies using the PET keyboard space bar for responding. I have two questions arriving from this:

1. Can push buttons connected to the User Port be 'PEEKed' instead of using the keyboard, or does this introduce unacceptable delays compared to a few milliseconds?

2. Can the program be altered to 'POKE' the User Port so the PET works as a pulse generator with eight output channels, or is this also restricted by the time taken to POKE and output.
W.C.R. Withers.

To use the User Port, it is necessary to tell the PET which of the lines are to be used as inputs and which as outputs. This is done, from BASIC or assembler, by storing a value in location 59459/$E843. Each bit in the value corresponds to one line of the user port; if you have a one in a bit position, that line will be programmed as an output, if you have a zero than that line will be an input. Here are some examples:

POKE 59459,0 All lines input.
POKE 59459,255 All lines output.
POKE 59459,15 Lines 0-3 outputs; lines 4-7 inputs.

The program can easily be altered to read the user port, by replacing the instructions from locations 340 to 344. Depending on how you arrange your hardware, the bits may be normally low, and set when you press a button, or normally high can cleared when you press a button. Assuming that they are normally low, you would need the following instructions:

```
0340 AD 43 E8      LDA E843
0343 29 01         AND #1
0345 F0 F9         BEQ 0340
```

The AND statement in location 0343 selects which of the user port lines you are going to test.

All this could be done in BASIC, but of course you will not get anything like the resolution you can get from an assembler routine.

As far as driving outputs from the user port to form a pulse generator, again you can do it from BASIC, but at the best you will be limited to frequencies less then 30 Hz, that is a period of 30 ms. Once again assembler rules!

Let me repeat my favourite warning that you must not connect things to your PET unless you are absolutely sure you know what you are doing. It is very easy to hurt either yourself or your PET if you are not careful.

Shifty Characters

Dear Tommy,
I have produced a price list program. The various descriptions of the items call for many commas, but I cannot save these on disk. I have evolved a rather clumsy routine using GET which screen and saves a shifted comma; the shifted comma is changed back into an ordinary one as the data is INPUT from the disk.

Is there a better way to get my PET to accept commas, preferably using INPUT? And why hasn't somebody produced a BASIC without this infuriating and seemingly unnecessary feature? Or have they?
Stewart Forbes

Well actually somebody has. MBASIC, the version of Microsoft BASIC which runs under CP/M, has a statement called LINE INPUT which does not suffer from this handicap. I suppose that this feature is vaguely useful if you want to enter three items with one INPUT:

100 INPUT A$,B$,C$

to which you might reply:

TOM, DICK, HARRY

but in my humble opinion, its disadvantages far outweigh its advantages. Now how to get round it. As far as keyboard input is concerned, there isn't much you can do about it, but then you should be using GET rather than INPUT for any serious application anyway.

For disk input, there is a fiddle you can do. You have to use fixed length records, but again in a serious application like this you probably will be doing anyway. Suppose that your disk file has records 60 characters long (not including the carriage return). If you try to INPUT# a record with a comma, then you will get a short record, as you have noticed. So you can tell from the length of the string you have input that something is wrong, and go back and get another one, like this:

```
1000 R$="" : REM R$ IS THE STRING TO CONTAIN THE RECORD
1010 INPUT Z$ : R$ = R$ + Z$ : REM GET STRING FROM DISK
1020 IF LEN (R$) = 60 THEN RETURN : REM READ WHOLE RECORD ?
1030 R$ = R$ + "," : GOTO 1010 :REM REPLACE "MISSING" COMMA
```

This routine does have the disadvantage that a colon (:) also causes this effect, so that any colons you record on the disk will be magically transformed into commas.

Hazy Strings

Dear Tommy,
I refer to your listing of the program 'Anagram Cracker' which I have put on my Sharp MZ-80K. Unfortunately it was not until I ran the program that I realised lines 95 and 685 have only 2 arguments for the MID$ statements and the Sharp requires 3. I am a little hazy as regards exactly what a MID$ does with 2 arguments. Could you please help in providing a procedure for Anagram Cracker that would work for the Sharp.
John Hunts

In those BASICs where the third argument is optional.

MID$ (A$,5)

is the same as saying

MID$ (A$,5,255)

that is

MID$ (A$,5,LEN (A$))

The effect is to say, "take the whole of A$ from the 5th character onwards", which is not quite the same as the RIGHT$ statement, which says, "take the 5 rightmost characters". Try this with various strings of different lengths to see what I mean.

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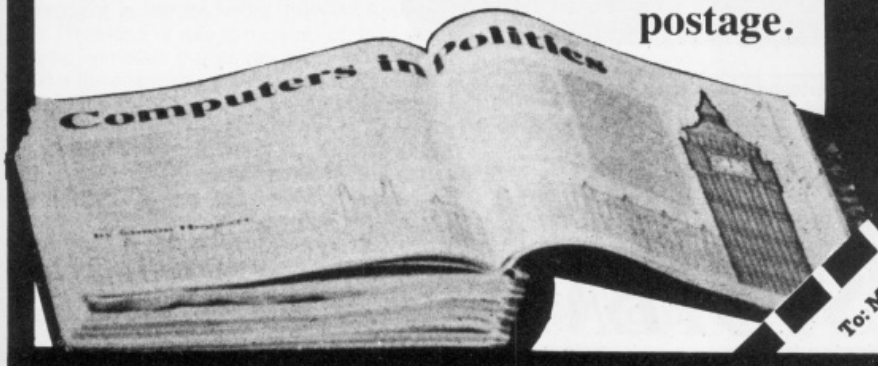

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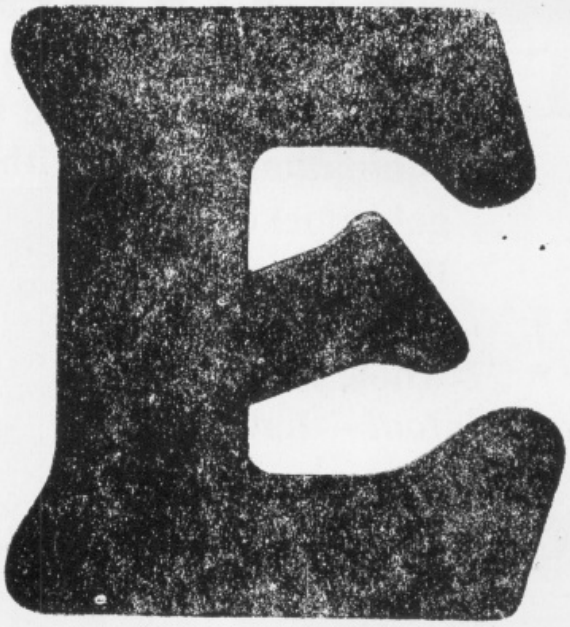

"If you want to know the time, ask a policeman" – Music hall song.

EXPERT SYSTEMS

'Expert Systems' are the most practical products to have come out of research into Artificial Intelligence. Using a limited knowledge field such as medical diagnosis, and Expert System will provide useful answers to questions in the way that a database can't. *John Gowans* examines the way in which such systems work.

The average copper's expertise in looking at his wristwatch is well known in all the best circles. Of course, thanks to the advent of the microchip (yawn) more people have digital wonders than they did in the music hall's heyday. Still, the principle holds good. If there is information you need, the tendency is to go to an expert with your cap in hand.

Never mind the fact that the expert probably only knows one subject in detail, and knows as much about anything else as your pet gerbil. If your question is in the right area, the expert will mull over his knowledge, place your request in context, and after much deliberation will – as experts have since the dawn of time – come up with an answer which is most likely wrong.

That's the cynical view at any rate. But in real life we rely on experts a lot to dribble out parts of their knowledge and help us come to rational and informed decisions. Hence the importance of an 'expert witness' in a court case, the reverence paid to someone who can understand bloodstains and tell fingerprints from each other.

Now the move is to turn computers into experts in their own right, or at least simulacra of the same (there's posh). And we will not just be asking them the time.

There's an important distinction to be made here between the questions you ask an expert system and the questions you ask any old database manager; which is not surprisingly the same distinction as that between asking a professor of tropical medicine the cause of malaria and asking Mr. Memory who won the Cup in 1956 or what the 39 steps are.

The difference is in expectation, what you expect to get from the computer in response to an enquiry. Databases are set up and structured purely to retrieve stored information as quickly and efficiently as possible. If a database manager came up with the response that "the information you need is 62% likely to be such and such, and you might also look profitably at information in these categories," you would wonder what it was up to. But this kind of sophisticated stuff, the kind of thing that fantasy computers have been doing since Hugo Gernsback in the 1930's, is what expert systems are supposed to do. It's time to look at what the things really are.

Artificial Intelligence

First of all, there are obviously a lot of artificial intelligence features embedded in the very concept of an expert system. Such a system is meant to replace a human expert in effect, storing detailed knowledge on a particular subject and capable of retrieving the right answer to complex questions based on its reservoir of information.

But compared with full artificial intelligence systems, where the computer is expected to mimic the behaviour of a complete human being in every set of circumstances, expert systems are easy to program. It has often been argued that experts are obsessional about their subject and are not really human. Ask any physics graduate the reaction at a party when they mention an interest in relativity – you might just as well be a representative of an alien race. And if you sense some personal grievance on behalf of the author here, that's fine by me.

No, an expert system just has to have a body of specialised information on tap in its memory combined with a set of rules that lay down the relationships and correlations between the information segments. Then if the user asks a question that lies within that body of knowledge, the computer can find the parts of its 'expertise' that are relevant, look at the relationships, produce an answer that it thinks is correct to some probability or other, and maybe even suggest further questions that might be asked to provide further enlightenment.

So now we know the theory. How would a programmer go about producing an expert system on a micro, or on any computer come to that?

The first step is clearly that of getting the information out of the human expert's head and into the computer's orbit. And since experts are famed for their reticence and discretion – or plain incomprehensibility to be less charitable – this can be a long and laborious job. Then again, which is the best of the many possible ways of representing this knowledge and the rules connecting the different items?

The simplest way, and thus the first to be tried by the rule of Ockham's Razor (misspelt

by lesser writers and by Inmos as Occam), is to combine the knowledge and the governing rules in the same set of 'if...then' statements.

The idea of this is that it mimics the way human beings solve problems. For instance, I would bet that none of my myriad readers works from first principles when asked a question like "would you like All Bran for breakfast today." All that you do is place the situation against set rules, such as "if All Bran yesterday, then no All Bran today", or "if bowel movement in last 24 hours, then All Bran is out". This kind of rule is the kind of thing the logical computer thrives on, and as we have said is the easiest way of making the machine look bright.

Logical Deduction

If you spend any time thinking about thinking, leaving aside De Bono and his super-simplifications, this will be obvious. When you put salt on your chips you don't think that here is a fortuitous combination of sodium and chloride ions, electonically bonded, that affects a certain area of the tongue in a certain way. No, all you do is think that the last time you put salt on some foodstuff or other it tasted better than it did on the occasions you didn't. Logical deduction and the scientific method are just overlays on this method of thinking, and not the precursor of it. So, to save us getting too turgid (swollen, enlarged, bloated, puffed up or out according to the esteemed Synonym Finder) all this is leading up to is that artifical intelligence assumes an education about the world in tiny quanta of fundamental fact. Expert systems just take the rules that have been shown to work in the world, without worrying about reality or fundamentals, and if the assumptions behind the rules are wrong they couldn't care less. Now that's what I call pragmatic.

Getting the rules into the computer system means interviewing the appropriate experts and going through the appropriate reference works in some detail. The digesting of the information into rules also takes time if you are going to be anything like comprehensive, and the amount of rules mounts up depending on the area you hope to cover. To give some examples, a specialised medical diagnosis system for blood diseases has about 450 rules, another system to configure DEC VAX-11 systems (not design them, just configure them) has about 800, and another that predicts the likelihood of mineral deposits in geology has about 1,600.

And these rules are not just 'if that, then that' types. Each rule has to have a weighting attached to say how likely the 'then' is for a particular 'if'. For example, if a wife comes home and finds a naked woman in the wardrobe, it is very likely that her husband is guilty, but just possible that it is his sister looking for some temporary clothes while hers are in the laundrette. Then again, a little heap of soil on the lawn is unlikely to be evidence of a burrowing extra-terrestrial organism on a tourist trip to Earth, but it is just possible. More likely to be a wormcast, but not definitely. You cannot assign the same probability to all the possibilities implied in a question.

But compared with full artificial intelligence systems, where the computer is expected to mimic the behaviour of a complete human being in every set of circumstances, expert systems are easy to program.

Still, this wrinkle is just an addition to the main rule structure, and not a difficult one. There is no problem in producing a rule reading "if this, then 28% probably that".

Learning Capacity

Rules of this type make up the knowledge base of today's not very intelligent artificially intelligent not very expert expert systems. But the structure of the program around the rules is by no means conventional. In a conventional program the code listing is the whole thing, and the input data from keyboard, disk, or wherever just slots into the code. But in an expert system the program comes in three parts. First there is the rule base, the set of ifs and thens that represent the knowledge. Then there is the fundamental program, a set of code that interprets the rules in the light of the input data, which is the third element in the system.

In this system there are elements of feedback as well, giving the expert computer some learning capacity. For example, the answer to a particular question from a user can be added to the knowledge base – which gives a new rule saying "if this question is asked, then this is the answer to give". Which might seem convoluted, but it is not that bad from a programming point of view.

In this way the database of questions asked can be added to the knowledge of the system and related to the set of rules to give extra strategies to answer more questions.

Now all this might seem very airy-fairy, or arty-farty if the Editor (may his potency never decrease) lets that through. But as artificial intelligence systems go expert systems are doing pretty well, and you can even buy them to run on a micro. One name to watch is Ibis, which has its MicroExpert package on the market right now. Naturally, the limitations of micros apply to such products in the same way as they apply to database management systems – not surprisingly since the two types of program have a lot in common.

Those limitations are in the size of the knowledge base that can be stored on floppy disk, in the complexity of program interpretation and feedback that can be implemented, and in the raw speed of the machine in searching its knowledge base to seek out one or more answers to a particular query.

In other words, it would be no use to use a micro to do the job of a GP in diagnosing just about every disease under the sun – or in some maniacal cases, under the moon. But is should be OK to set one up to answer queries on the stamps and first-day covers of the Pacific and Atlantic islands, and so put my dad out of a job. Sorry Pater, but you might still be able to act as input data.

Inferences

But how do expert systems differ from database managers in their response to queries? Quickest way to explain is by example, I'm afraid. With a database you might ask it "How many of my employees have moved house/bought new car in the last three months"? and receive the correct answer of "42" with breakdowns of particular names if necessary. With an expert system on the same job, with data on tax dodges, mortgage rates, salary levels and so on, you might get the answer "42, with a 26% probability of expenses fiddling by Rumpole and just about everybody else, a 4% probability of embezzlement by Pawson (no relation), and a –0.001 probability of anyone buying a car with his or her own cash". Note the extra details and the drawn inferences on the basis of existing data and input.

One odd advantage of expert systems is that you can give them an answer and ask what the question should have been.

One odd advantage of expert systems is that you can give than an answer and ask what the question should have been. Or to put it another way, you can use a goal-driven

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backward-chaining consequent reasoning procedure strategy. In this process you feed in the end-result and the system can check through the rules it has from the 'then' end to find out the 'ifs' that would bring it about – with suitable probability provisos of course.

Digression #1: Odd things you hear on the radio while panically (is that OK?) writing stuff like this. I am at present listening to an LBC discussion on the way 'expert' has become a swear-word in the general opinion of the masses, "Expertism is just a fashion," says Brian Ford, author of 'The Cult of the Expert'. "We do need specialists in particular disciplines," he says, adding that they should not be bowed down to just because they are experts. – *End of Digression #1*

This way of putting expert systems together is pretty handy for system builders. The separation of the knowledge base from the general-purpose rule interpreter and input data means that the system can easily – well, roughly – be reconfigured by plugging in a different knowledge base. Switching between disks could give you expert advice on investing in property abroad, the structure of aromatic organic compounds, and the likelihood of tempting the man or woman of your choice into a far from honourable liaison.

Okay, that is an expert system. But as the proverbial – and on this magazine, probably mythical – intelligent reader has noticed, we have not covered the whole field. "The human being", this person will be saying, "does not have everything tied down to hard and fast logical rules". And the reader, should he exist, would have a good point. How else to explain the undoubted fact of people voting for Margaret Thatcher? How could it be that people are happy to read *Practical Computing*? The answer is fuzzy logic.

Fuzzy Logic

Have no fear, computer programmers are grabbing fuzzy logic by its fuzzy throat. The idea is that the expert system can start to take into account the irrationality, unpredictability, and sheer bloody-mindedness (is that OK as well, Richard?) of humanity. Once again this is no problem for the programmers. It is no problem at all to stick some predictable unpredictability into the programs. And I'm afraid that the human's hunches, intuition, twitches, and aching in the joints if it's going to rain all come into the pretty predictable category, computer percentage-wise.

This predictability of unpredictability is the only thing that stops programmers using random number generators and stock phrases, like *Readers Digest*, in supposed expert systems. Fuzzy logic in now respectable, and if it is incorporated in such systems, which can now make the same kind of guesses and stupid decisions as the rest of us do. But only if the decisions are strictly based on real information from real experts like my dad and his stamps.

Fuzzy logic is now respectable, and if it is incorporated in such systems, can now make the same kind of guesses and stupid decisions as the rest of us do.

Now the odd thing about expert systems is that is so easy to implement them on any computer you happen to have lying around – and if you are Guy Kewney, that could be one computer for every day of the month. The first thing you learn in computing, give or take the odd thing like the method of getting programs started, is the 'if...then' construction. And it is the 'if...then' that forms the basis of any expert system's knowledge base.

In structure, expert systems have pretty similar structures. There is the knowledge base of rules, the rule interpreter program, and the global database of questions or assertions that have been asked or made about the area of expertise. And although boasts may be made about the generality of the systems, so that switching one knowledge base for another would produce a different system, any specialisation has its own peculiarities. Although it is not quoted in the literature, language and jargon is one of these peculiar features. It is no use for someone like myself, whom some call a chip technology expert and others call a variety of other things, to ask "how would an ECL leadless chip carrier beat a single chip bipolar microcoded chip set for speed?" unless the rule interpreter and global base used my vocabulary.

...there is certainly a case for regarding expert systems as 'soggy databases'...

New Languages

The language the expert system is written in also has a definite effect on speed and effectiveness. BASIC, although it can be used, is as useful in this application as a pair of socks to Long John Silver. Pascal and LISP, the latter a particular favourite for AI research, will not really do either.

It seems as though new languages are needed to represent knowledge in a way that will be useful to an expert system. And they are not around just yet.

And there are a few fundamental points that will probably – in fact certainly – never be solved. The first is that there is a lot going on in the brain of a human expert, stuff that can never be rule-coded no matter how intensive the interrogation is. The second is that any expert talking to an audience assumes a certain level of basic knowledge. The expert is not used to talking down to people as much as he or she must talk down to get the knowledge onto a computer. In condescension, it seems as though my University tutors were an unfortunate exception to a general rule.

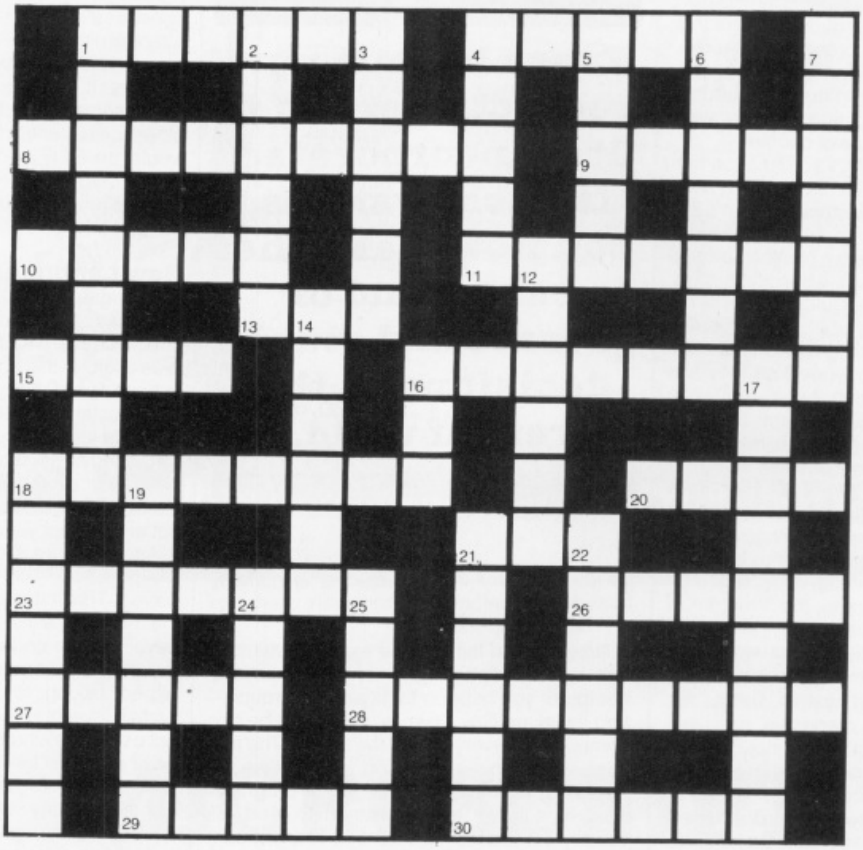
There is a lot going on in expert systems, even though most of them are immense programs written in LISP and totally incomprehensible to most micro users. And there is certainly a case for regarding expert systems as 'soggy databases', which is what one commentator called them recently.

But the arguments raised by this particular commentator are just the same as those that could be raised about computers as a whole, and the objections raised are the kind of trivia that I have not been afraid to raise here. There is a good case, I feel, for expert systems to be put in charge of writing all magazine and newspaper editorial leaders. I would be willing to place a bet that most readers would not notice the difference.

Odd things that experts get up to. And as some kind of expert myself, in a small way at least, I would like to say that I couldn't care less about expert systems. As long as they still can't pick out news stories with success probabilities more than 85%, I can still hang on.

To end with *Digression #2*: a very happy Christmas and New Year to my reader. The rest of you can eat cake. *Digression #2* ends.

Computer Crossword



CLUES ACROSS

1. Hands Off! – no, it's Ed.(6)
4 & 5 down. Maker of "not the BBC micro".(5,5)
8. Pet breeders still, despite change of model names.(9)
9. Fashionable group a 20 might produce.(5)
10. Customer gets in program combining.(5)
11. All back amongst the rest is star-like.(7)
13. Return or escape initially – it's fishy.(3)
15 & 18 across. Being this, the micro gives a good hand-shake!(4,8)
16. Instructions that might be basic.(8)
20 & 1 down. Press door, crow for better text.(4,9)
21. With elegance, Tommy's initial tips might need mopping up.(3)
23. Asserted to have rewired heartlessly.(7)
26. Drink around a chip for her.(5)
27. Sounds dull, but it's handy extension when with mother.(5)
28. Regulator to mould rota.(9)
29. Flower that spins round for different characters.(5)
30. Odd or even bit.(6)

CLUES DOWN

1. See 20 across.
2. How programs run when not compiled.(6)
3. Silly fool in the soup bowl.(7)
4. Operators don't use his, commonly.(5)
5. See 4 across.
6. Greek character making LP noise.(7)
7. Profits needed by subroutines.(7)
12. Place of worship with a microprocessor at its heart.(6)
14. Nervy as it might be Sharp.(2,4)
16. Shy but not quiet copy.(3)
17. Princess at home with the Rector compiles disk index.(9)
18. Kind of plotter, lying horizontally.(7)
19. Microprocessor and antelope country.(7)
21. But you don't need to do this to obtain a clock pulse!(4,2)
22. Atari logs less gas, about to customize programs.(7)
24. Half diameters.(5)
25. Display the contents of variable E, one hears, and squat.(5)

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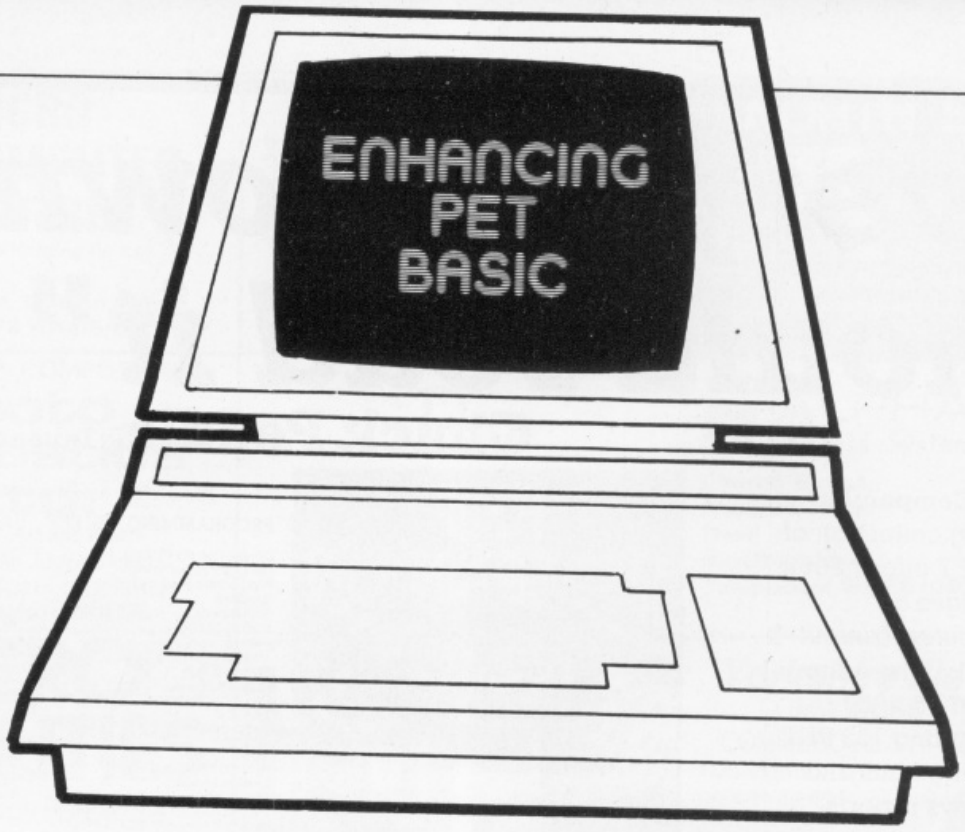

Dave Wardill and **Dave Barrett** continue their series – adding new keywords to PET's BASIC.

When the newcomer to file handling has successfully written his files, brimming with names, addresses, and every conceivable combination of useful data fields, he finds that his problems are just beginning.

How does he find anything again?

Suppose that he wants to find all the references to someone called Smith which exist in an array which he has called NAME$. It would be easy enough, if rather slow, to use some code like this.

```
100 FOR I=1 TO 1000
110 IF LEFT$(NAME$(I),5)="SMITH" THEN PRINT I
120 NEXT
```

But what if the object of his search was filed as Smith, or as smith? His code does not allow for upper and lower case letters, and so some names might get overlooked.

What if initials have been used in some cases, and not in others? Then looking at the leftmost five characters will not work, as the 'Smith' part of the file will be in the middle of the field, not at the left.

At times like these, BASIC appears at it's clumsiest.

```
200 FOR I=1 TO 1000
210 FOR J=1 TO LEN(NAME$(I))-5
220 IF MID$(NAME$(I),J,5)="SMITH"THEN PRINT I
230 IF MID$(NAME$(I),J,5)="Smith" THEN PRINT I
240 NEXT J
250 NEXT I
```

Now try running it! The search for one name in one file can tie your computer up for hours, without any absolute guarantee of success at the end. If BASIC is your only recourse, then proper file handling is extremely difficult. It may even be more efficient to keep a card index by hand.

Because of the vast time needed to search for subsets within fields, we felt that a new word was needed.

Seek

The efficiency of the new code can be seen from this example.

```
300 A$ = "SMITH"
310 SEEK A$ IN NAME$(1)
320 PRINT NAME$(PL%)
```

This will search all the elements of NAME$ starting at the first element, for any occurrence of the name 'SMITH'. It will report any location of the word, whether in capital or lower case letters, or any combination.

It will find the name if it is at the beginning, the middle or the end of a string, and will report accordingly by putting the number of the element where a match has been found, into a variable called PL%. If no match is found, PL% contains –1. This can be used in the rest of your program, as the example below shows.

The element at which the search starts can be defined. In the example above, the search started at the first element, but this can be varied either directly or under program control. This is extremely useful for finding multiple occurrences of a word.

Example

```
400 P=1
410 A$="SMITH"
420 SEEK A$ IN NAME$(P)
430 IF PL%<0THEN PRINT "NO MATCH":GOTO 500
440 PRINT NAME$(PL%)
450P=PL%+1:GOTO420
```

This starts the search at the first element, and prints out the first match it finds. The search is then restarted from the next element, and further occurrences are found.

Spelling

The problem sometimes arises that you are not sure of the spelling of a name. Suppose that you are not sure whether you are looking for Smith or Smythe, for example.

The question mark can be used, as it is in other programs on the PET, as a wild-card letter. Judiciously used, any name can easily be found.

```
500 A$="SM?TH"

will find both Smith and Smythe in this case.
```

Speed

How fast is it? Compared with the sort of BASIC program shown above, it must seem infinitely fast. In fact, a full search of a 1000 element array takes about one second. This type of search, where no match is found, obviously takes the longest possible time so searches where a match is found fairly early on, will seem imperceptible. We leave it to you to do your own time trials on your own data, but we wil be surprised to hear of any other machine code which is much faster.

How To Use It

The example above will have given you a good idea of how to build it in to your own programs. However, there are two jobs which you will have to do first.

You can either use this word as a part of the BASIC additions which we first described in the June issue of *MicroComputer Printout*.

Alternatively, you can use the PET monitor, or EXTRAMON,or an Assembler, to enter the code into memory. We have shown it located at $7200. This will make it easy to locate it above the routines for KEYINP and PADINP which we gave you in September, and which are also useful for file handling.

If you have a smaller memory PET then you will have to decide where to locate it for yourself. It will relocate without any difficulty, as long as you recalculate the 'SYS' address.

Top Of Memory

The other job which you must do is to cut off the top of memory so that your strings don't get written all over the top of your machine code.

```
This can be done from within your BASIC program by
100 POKE49,112:POKE50,0:POKE53,112:POKE54,0
(With a 16K PET, change the '112' to '48'
```

If your are going to use the routine as a piece of machine code to be called by a 'SYS' call, then the syntax which would be used in line 420 above is

```
420 SYS 28672, A$ IN NAME$(P)
```

We hope that this helps you to use this useful routine in your own programs. When it is used with the other published words, like KEYINP, PADINP and SORT, it gives considerable power to the PET, particularly when it is used for file handling.

```
1000 ;#################################################################
1010 ;#
1020 ;#                 FIND $TRING
1030 ;#                 +++++++++++
1040 ;#
1050 ;#  FORMAT
1060 ;#  ++++++
1070 ;#
1080 ;#  BASIC SEEK A$ IN B$(X) -CHANGE START ADDRESS TO SUIT YOUR NEEDS
1090 ;#  +++++
1100 ;#
1110 ;#  NON BASIC SYS28672,A$ IN B$(X)
1120 ;#  +++++++++
1130 ;#
1140 ;#  '?'CAN BE USED FOR UNKNOWN CHARACTERS
1150 ;#
1160 ;#  '*'IS OF NO USE AS THIS ROUTINE ALSO DOES AN 'INSTRING' TYPE CHEC>
1170 ;#
1180 ;#+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
1190 ;#
1200 ;#  SO IF A$="SMITH" IT WOULD FIND
1210 ;#
1220 ;#             SMITH B
1230 ;#  OR
1240 ;#             TAYLOR-SMITH R F
1250 ;#  OR EVEN
1260 ;#             BLACKSMITH A
1270 ;#
1280 ;#+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
1290 ;#
1300 ;#  THE ROUTINE DOES NOT DIFFERENTIATE BETWEEN UPPER AND LOWER CASE
1310 ;#  LETTERS, SO THERE IS NO PROBLEM IN HAVING TO KNOW WHETHER A LETTER
1320 ;#  IS A CAPITAL OR NOT, AS MIGHT BE THE CASE WITH SOME NAMES.
1330 ;#
1340 ;#  IF NO MATCH IS FOUND THEN PLX IS SET TO -1
1350 ;#
1360 ;#  IF A MATCH OCCURS PLX IS SET TO SHOW THE ELEMENT WHERE MATCH OCCURED
1370 ;#
1380 ;#  IF USED IN 'NON-BASIC' FASHION REMEMBER TO RESET MEMTOP
1390 ;#
1400 ;#################################################################
1410 ;
1420 ;
1430 *=$7000
1440 ;
1450 ;
1460 ;
1470 ;ROUTINES SHOWN HERE ARE FOR BASIC4
1480 ;++++++++++++++++++++++++++++++++++
1490 COMMA =$BEF5
1500 FINVAR=$C12B
1510 SYNTAX=$BF00
1520 CREVAR=$C107
1530 CVARNM=$42
1540 CVARAD=$44
1550 ARSIZE=$1C
1560 ARSTRT=$11
1570 ARLEN =$19
1580 ARPNT =$1A
1590 STRLEN=$16
1600 STRPNT=$17
1610 TYPE  =$07
1620 OFFSET=$21
1630 ELEM  =$03
1640 ;
1650 ;
1660          JSR COMMA       ;NON BASIC ENTRY POINT
1670 SEEK     JSR FINVAR      ;BASIC ENTRY POINT
1680          LDA TYPE        ;STRING?
1690          BNE CONT        ;YES: CARRY ON
1700 ERROR    JMP SYNTAX      ;NO: 'SYNTAX ERROR' IN XXXX'
1710 ;
1720 CONT     LDY $02         ;SAVE POINTERS FOR A$
1730 AGAIN    LDA (CVARAD),Y
1740          STA $0016,Y
1750          DEY
1760          BPL AGAIN
1770 ;
1780          LDY STRLEN      ;CHECK STRING LENGTH
1790          BNE AROUND      ;NOT ZERO LENGTH, SO CONTINUE
1800          RTS             ;A$ MUST BE 'NULL' LENGTH, SO RETURN TO BASIC
1810 ;
1820 ;#################################################################
1830 ;#
1840 ;#  YOU COULD ADD THE 'NULL STRING' ERROR
1850 ;#  ROUTINE SHOWN IN THE KEYINP CODING (JULY 1982, PRINTOUT)
1860 ;#  INSTEAD OF RETURNING TO BASIC
1870 ;#
1880 ;#################################################################
1890 ;
1900 AROUND LDA #'I          ;CHECK FOR 'IN'
1910          JSR COMMA+2
1920          LDA #'N
1930          JSR COMMA+2
1940 ;
1950          JSR FINVAR      ;FIND DIMENSIONED ARRAY
1960          LDA TYPE        ;AND CHECK ITS TYPE
1970          BEQ ERROR       ;NOT A STRING, SO ERROR EXIT
1980 ;
1990          LDY #$04        ;THE STRING MUST BE
2000          LDA ($5C),Y
2010          CMP #$01        ;A ONE DIMENSIONAL ARRAY,
2020          BNE ERROR       ;OR ELSE IT WON'T WORK
2030 ;
2040          INY             ;FIND AND SAVE
2050          LDA ($5C),Y
2060          STA ARSIZE
2070          INY             ;THE MAXIMUM DIMENSION
2080          LDA ($5C),Y
2090          STA ARSIZE+1    ;OF THE ARRAY FOR FUTURE REFERENCE
2100 ;
```

```
2110          LDA $61          ;FIND AND SAVE
2120          LDX $62
2130          STA ARSTRT+1     ;THE START ELEMENT NUMBER (EG B%(9))
2140          STX ARSTRT       ;
2150 ;
2160 NEXT1    LDY #$02         ;FIND AND SAVE
2170 AGAIN1   LDA (CVARAD),Y
2180          STA $0019,Y      ;THE POINTERS
2190          DEY
2200          BPL AGAIN1       ;FOR THE]CURRENT ELEMENT OF THE ARRAY
2210 ;
2220          LDY ARLEN        ;IF IT IS OF
2230          BEQ NEXT         ; ZERO LENGTH, TRY NEXT ELEMENT
2240 ;
2250 CHECK    LDY STRLEN
2260          DEY ABLEN
2270          BNE DOINST       ;SO DO 'INSTRING' TYPE SEARCH
2280          LDA #$00         ;THE STRINGS MUST BE EQUAL IN LENGTH
2290          STA OFFSET       ;SO SET OFFSET TO ZERO BEFORE WE
2300          BEQ OK           ;GO TO CHECK THE STRINGS
2310 ;
2320 DOINST   BCS NEXT         ;A$ IS LONGER, SO GO TO TRY THE NEXT ELEMENT
2330          SEC              ;SET UP
2340          LDA ARLEN
2350          SBC STRLEN       ;FIND THE NUMBER OF
2360          STA OFFSET       ;TIMES WE MUST GO THROUGH FOR THIS ELEMENT
2370 ;
2380 OK       LDY #$00
2390 ANOTH    LDA (STRPNT),Y   ;PREPARE TO
2400          AND #$7F         ;DISREGARD UPPER CASE
2410          CMP #'?          ;IF IT IS A QUESTION MARK,
2420          BEQ CONT2        ;GO ON TO THE NEXT BYTE
2430          PHA              ;SAVE THE CHR IN A$
2440          TYA
2450          CLC
2460          ADC OFFSET       ;ADD THE OFFSET
2470          TAY              ;TO THE Y REG
2480          LDA (ARPNT),Y
2490          AND #$7F         ;DISREGARD UPPER CASE
2500          STA ELEM         ;SAVE IT
2510          PLA              ;GET BACK THE BYTE IN A$
2520          CMP ELEM         ;AND COMPARE BYTES
2530          BNE INSTRG       ;IF NOT EQUAL, ARE THERE ANY MORE CHECKS
2540          TYA              ;FOR THIS ELEMENT?
2550          SEC              ;RESET THE Y REGISTER
2560          SBC OFFSET
2570          TAY              ;AND PUT IT BACK
2580 CONT2    INY
2590          CPY STRLEN       ;WE ARE CHECKING TO SEE IF ANY MORE OF THE
2600                           ;NEEDS TO BE COMPARED
2610          BNE ANOTH        ;YES: MORE TO BE CHECKED
2620          BEQ SETPL        ;NO: SO BEHAVE A MATCH, AND MUST SET PL%
2630 ;
2640 INSTRG   DEC OFFSET       ;DECREMENT START POSITION IN B%(X)
2650          LDA OFFSET
2660          BPL OK           ;AND CONTINUE CHECKING UNTIL OFFSET IS NEG
2670 ;
2680 ;
2690 NEXT     INC ARSTRT+1     ;FIND THE NEXT ELEMENT NUMBER,
2700          BNE CONT4
2710          INC ARSTRT       ;AND SEE IF IT IS WITHIN
2720 CONT4    LDA ARSTRT
2730          CMP ARSIZE       ;THE MAXIMUM
2740          BNE CONT5
2750          LDA ARSTRT+1     ;   ALLOWED FOR IN THE DIMENSIONED ARRAY
2760          CMP ARSIZE+1
2770          BCC CONT5        ;YES IT IS!
2780 ;
2790          LDA #$FF         ;NO IT IS'NT!
2800          STA ARSTRT       ;SO WE MUST SET
2810          STA ARSTRT+1     ;PL% TO EQUAL -1
2820          BNE SETPL        ;TO SHOW NO MATCH OCCURED
2830 ;
2840 CONT5    CLC              ;INCREMENT POINTERS FOR
2850          LDA #$03
2860          ADC CVARAD       ; NEXT ARRAY ELEMENT TO BE LOOKED AT
2870          STA CVARAD
2880          LDA #$00
2890          ADC CVARAD+1
2900          STA CVARAD+1
2910          BCC NEXT1        ;THIS IS A FORCED JUMP TO CONTINUE AS THE
2920                           ;CARRY FLAG SHOULD ALWAYS BE CLEAR
2930                           ;AFTER AN 'ADC' INSTRUCTION
2940 ;
2950 SETPL    LDA #$D0         ;P
2960          STA CVARNM
2970          LDA #$CC         ;L%
2980          STA CVARNM+1
2990          JSR CREVAR       ;SET IT UP
3000          LDY #$00
3010          LDA ARSTRT
3020          STA (CVARAD),Y   ;AND SAVE THE
3030          LDA ARSTRT+1
3040          INY
3050          STA (CVARAD),Y   ;VALUE GIVEN BY THE ELEMENT NUMBER (OR-1!)
3060          RTS              ;FINISHED!
3070 ;
3080 ;
3090 ;
3100 ;
3110 ;
3120 .END
```

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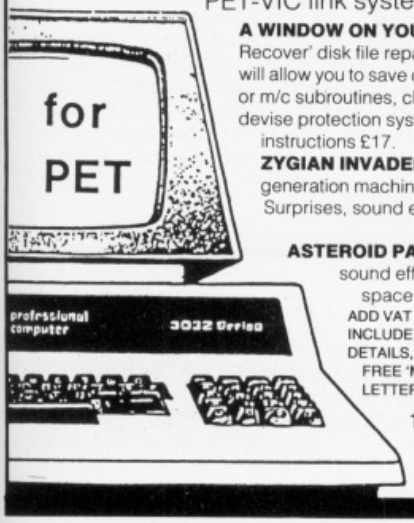

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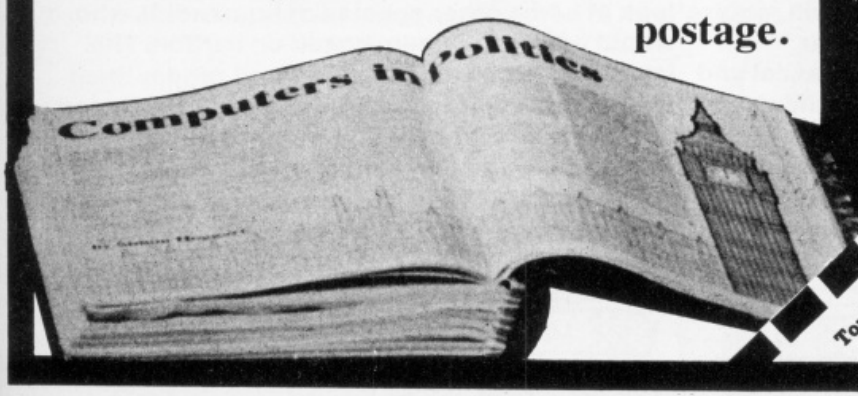

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Humphrey Walwyn looks at six species of non-computer people, all in danger of extinction by the end of this century...

Non-Computer People.

Endangered Species

As the silicon invasion continues, natural evolution will take place...the survival of the fittest. By 1992,'ASTEROIDS' will feature in the Olympic Games. Most job interviews will be hold in BASIC but some senior poast will require written appications in COBOL. Five star restaurants will print their menus in Pascal and bright young things in lifts will entertain wach other with smutty jokes in machine code providing the Boss isn't "on-line". Computer illiteracy will be no defense to a motoring infringement if all road signs are written in FORTRAN. Worst of all, a failure to be included in DATA banks might result in total oblivion...er...sorry, WHO?

Last month we looked at some of the new generations of silicon-bred fauna who are starting to populate the Earth. This month we look at some other species of humanoids who would prefer to remain based on carbon. The laws of natural selection may well render them extinct in ten years time. They are all 'protected species' and some of them require care, understanding and a preservation order. Others have set their minds so resolutely against any form of change that they don't deserve to survive to the next decade.

Form your own conservation groups now...

SECRETARIA NON-PROCESSOR

Description & Classification:
Normally to be found within the offices of BUSINUS NON-COMPUTERUS, her only electronic aspirations are for a new golf-ball machine. Her sole experience of an office computer was in 1983 when she glitched the firm's mailing list DATA all over the pot plants and the office cleaner removed all known traces of forthcoming export orders by turning on the hoover at the wrong moment. This traumatic event convinced her the processors, tele-modems and linkage systems were entirely unreliable. Since that date, life has passed her by. Voice-transfer dictation machines and automatic-spelling-erasure type systems may now rule all offices but she would rather handle the paper herself. In her officce, 'Typex' is better than 'auto-correction'. Good typing is an art to her. She is creative with a critical appraisal of layout, margins and spacing. "I know everyone processes their letters nowadays but you can always TELL when it's computerised, can't you?" She's an incurable optimist. 1990's technology is OUT. The only silicon product in her office is typewriter lubricant.

Habits:
She often smiles at herself in the mirror. This is because she knows she will never work in a typing pool again. Even the silicon revolution has brought its own share of Satanic mill labour...typing pool workers now slave over rows of glowing V.D.U.s in a lcattering air-conditioned brightness. To join their ranks, you must have 4 'A' levels and a degree in 'Applied Technology'. She is happy to be a personal secretary and actually TALK to real people. What's more, other people like to talk to HER. Her work-mates are thoroughly unattractive. They have all developed 'Green screen sickness' and stare at each other with square rimmed eyes. They have nothing intelligent to say because they've forgotten how to speak.

Conservation Advice:
Only the best may survive, but there'll always be a place for good secretaries.

NON-LINKED CORNERUS SHOP

Description & Classification:
The owner of this business enterprise belongs to an odd breed. There is a belief going round that people actually prefer to look at the produce on a shelf before they part with their DATACARD credits. Of course, it'll never catch on since it's so much easier to order your sausages and 'instant Coq-au-vin' fromm the home video display. Heavens, if people could examine the produce BEFORE they purhcased it them they might not buy it at all...and that's bad news for the international food distribution agencies!

Back up by this belief, NON-LINK CORNERUS SHOP still survives. He/she works extremely long hours (long into the afternoon!) while the rest of us view STARWARS 23 on our videos after a hard workingh 25 hour week. What's in it for them? Well, their habits give us a clue...

Habits:
They are friendly people and converse with their customers ("Hullo, yes certainly, which one would you like?" etc.) This means they probably derive satisfaction from meeting other human beings. Some customers are bewildered by this and tend to withdraw into their silicate shells (their home-computer link doesn't talk back as and EQUAL). Normally all shopping is conducted via the cable link or in enormous marketing halls were electric truckettes convey your choice automatically to the check-out desks. The markets are proud of the pact that "No Human Hand is involved" and – to stop heart attacks – no customer need ever see the bill since a voice synthesiser checks the credit account with an impersonal – "Thank you and Have a Nice Day". The idea of 'Not being on-line' is strange. But it's quite nice when you get used to it.

Conservation Advice:
Market economics will continue to threaten their survival but if there's s demand then no when a mains failure wipes my DATA CREDIT, where am I going to buy half a dozen eggs at 6.00pm?

COMPUTERUS NON - BUSINUS

Description & Classification:
An elitist species of commercial traders whose financial status is increasingly dominated by the law of diminishing returns. He/she still believes that 'the personal approach' is good for business and maintains that: "Good old Jenkins in accounts (who has been with me for YEARS)is far more reliable than any damn machine!"

Basically suspicious of anything electrical, he keeps a treasured mechanical adding machine in the office ("The Excalibur – 50 years old and still works like a dream") but has at least allowed a friend to buy him a calculator for his audits. ("clever people these Taiwanese"). He wears a watch with real hands on it and his proudest possession is an 'eight day' desk clock that his secretary rewinds with religious fantacism at 9.30 am every weekday. (NB: A 'clock' was a pre-digital spring-driven time-piece requiring manual winding).

Habits:
He is frequently harrassed and over-worked. There just isn't the TIME to worry about the commerical competition. Being pre-occupied with sub-totals that don't add-up, he spends many hours trying to find out where the missing figures went. Much of his life is dedicated to the worship of paper and he smiles upon rows of box-files. He is neat, careful and tidy and insists that the ledgers are works of art as well as detailed records of any transactions. Happiness is a pile of date-stamped invoices. There's only one thing that makes him laugh out loud:
"Ha! Told you so! Their wretched computer's up the creek again!"

Conservation Advice:
Unfortunately his chances are not good. UK paper postal deliveries ceased in 1988 owing to a lack of demand. Advice notes are out...tele-invoicing is in. Since he's not 'on-line', no one can give him new orders. He's like a doomed ostrich burying his head in reams of A4.

CONSUMERUS NON-ELEKTRONIKUS

Description & Classification:
Can easily be recognised by the facthe/she has never been known to purchase a battery. They look perfectly normal, are basically normal and live in perfectly normal homes. EXCEPT they don't have a television! 1990's society has ostracised this strange breed – despite the enormous technical drawba in being unconnected to the national cabl network – they have religiously opposed t... scientific advances and even give their children BOOKS to READ as presents. Naturally this is against the law. Books are "unsuitable learning aids as they don't allow personal expansion". Books are simply R.O.M. (Read Only Material). R.A.M. is what counts nowadays. Interactive electronic education is the norm. Whilst the classroom is into "higher symbiosis", THEIR children are into Bronte and Dickens *Who? Ed.* This whole species is a suitable case for treatment.

Habits:
Very strange. Since they don't have an interactive terminal at home, they have to do all their own shopping in the few shops that still cater for the 'personal buyer'. They even go out for their entertainment to the few remaining cinemas, concert halls (to hear "live" synthesisers) and restaurants (not the ones with PASCAL on the menu). The rest of us of course have everything shoved down a line to our homes. What's the point in watching a "live" football match when you pay for it on TV? Besides which, it's cold outside! Other strange habits include playing games of 'cards' (a manual pastime involving bits of coloured plastic) and writting letters by HAND!!! Get this for a laugh... they even play chess with EACH OTHER!! Pitiful, pitiful...

Conservation Advice:
Frankly it's difficult to see how this breed has survived so long. There's no need to slap a preservation order on them. If they're so resolute, they'll survie of their own accord. Poor people...they just don't know what they're missing!

ARTISTICUS NON-COMPUTERUS

Description & Classification:
This species is part of a rapidly vanishing group. In the early 1980's they were known under various headings..."graphic artist", "painter", "cartoonist", "design sepcialist" and "layout artist".

Nowadays there are so few of them left that conservation orders alone are responsible for their survival. Some of their work can still be seen behind the electrified fence and 3 metres of 'securo-glass' at the Tate Gallery; all the rest of our cultural heritage was put on video and the originals sold to texas in 1987 to save the UK national software debt. ARTISTICUS NON-COMPUTERUS can be recognised by the ink stains on the hand. Yes, amazingly they still use things like paper, pens and felt-tips. Along with MUSICA NON-SYNTHESA, both species are part of the endangered classification: CREATIVI INDIVIDUALI. Their survival became in doubt in 1987 when the 'Arts Council' (as it was known) ran out of funds and was replaced by a chip. An operator error subsequently turned the National Theatre into a gigantic DATA storage complex.
(NB: 'Theatre' was a strange form of entertainment using REAL people).

Habits:
Many of them feel resentment since their training and talents are mostly ignored by the video society. When holographic-synthesis replaced stage design, computer graphics did away with creative layouts and paints were considered un-safe for children, lots of people lost their jobs. You can still see some of them scribbling on the silicon side-walks. The artwork may be crude but it isn't surprising when you consider it's actually drawn BY HAND! Some of them eak out a living sketching other human beings. Of course, the result isn't a patch on modern 'photo-grafix' but it can be interesting.

Conservation Advice:
If only we'd thought about it in 1985! Once imagination was replaced by automation, no one was creative enough to remember what 'creative art' was all about.

MUSICA NON-SYNTHESA

Description & Classification:
Mostly recognisable from what they are carrying. These are strange shaped objects ranging from feminine forms wrapped in brown canvas to small black boxes (not unlike 'porta-modems' but minus a V.D.U.). They were first threatened by the advent in the early 1970's of the single keyboard monophonic synthesiser but since the unit could only produce electronic twanging noises, creative musicianship was not threatened. In the 1980's, however, polyphonic music music synthesis became more developed and it became possible for a single machine to sound remarkably like an entire string section. It may seem strange today – what with our multi-synth modules and home operated music-processors – but there really was once a time when music was played on instruments by individual musicians. Popular music was performed by groups of 4 or 5 musicians instead of just one. Classical music often involved 'orchestras' – collections of 40 or more people all playing together!

Well it just couldn't last. When the record companies turned over to video entertainment in the mid '80s, "live" music became a thing of the past. Nowadays, the star on "Top of the Pops' is a programmers with his box of chips. The classics are digitally encoded by technicians and replayed with total precision down cables to every home. Not a note is out of place and the tuning is clinically perfect. How lucky we are!

Habits:
Although it's illegal, they tend to practice secretly at home. You can still see them occasionally busking on street corners (do give 'em a 10 pound coin or two), or playing at children's parties (the kids think they're highly amusing!).

Conservation Advice:
Along with other CREATIVI INDIVDUALI, it's a bit late now. We should have done something about them in the mid '80s. We may have 'perfect' music in the '90s, but it all seems to sound the same. Real music must have been different and fun!.

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MICRO COMPUTER PRINTOUT

A PLAIN MAN'S GUIDE TO PERSONAL COMPUTING

CHESSMATE

The way to become proficient at anything is to study the form of the experts. Chess is no exception. This month *Bob Chappell* has developed a top quality program that allows you to key-in, store, replay and analyse chess games.

Grandmasters always recommend studying the games of champions to improve your own play. Playing through such games, one can try to observe and get inside the mind of the champion, testing out and experimenting with the various lines of play that present themselves during the course of the game.

Chessmate has been designed to be an aid to such study and experimentation, as well as a convenient way of permanently storing, retrieving and replaying favourite games. Although written on a Pet, it should not be too difficult to convert it for most other micros, the graphics being fairly straightforward.

The program commences by presenting you with a menu:-

1. Build a game.
2. Replay a game stored in memory.
3. Read a game from tape.
4. Write a game to tape.
5. List the stored moves.
6. Replay the sample game.
7. Display the instructions.

Full instructions on using all the program's facilities are obtained by selecting option 7. I shall not go into them in any depth here; you can read them from the program listing, lines 1950-2950. Entering moves is by normal algebraic notation. Queening, en passant and castling are all catered for and you can set up various board positions at any stage by adding, removing or replacing pieces anywhere on the board.

Using the above facilities, as well as normal moves, you can build up a section or a complete game in the computer's memory for later saving to tape (conversion to disk is very simple). You can cancel a wrongly entered move (provided the Return or Enter key has not been pressed) by typing the hash symbol. The end of a game is signified to the program by the entry of four asterisks in place of the usual entry.

Before playing a game, one must either have built up a series of moves in memory or have read in from tape a previously saved game. To get you familiar with some of the facilities, a game has already been embedded in the program. To replay this fixed game, simply select option 6 on the menu. You might wish to permanently replace this game later with one of your own favourites. The data statements at lines 3050-3090 contain the moves for the embedded game.

When replaying a game, you can either single step through it, allowing you to study each position at your leisure, or instruct it to progress automatically, moves taking place with no delay. You can switch between modes at any time. The current move is displayed in highlight at the bottom of the list column before being transferred to the list of the last 17 moves (this list is continuously updated so that the last 17 moves are always on display). The piece being moved will flash on the chessboard, both on its originating square and destination square. You can leave a replay at any time by pressing M to return to the menu. You must also press M when the replay is complete.

During a replay, you may jump around a series of moves by using the J command. Thus typing J77 will immediately restart the replay as if the game had already reached the 77th move (the board position will reflect this). Similarly, JO will start the game from the very beginning. You can jump backwards and forwards at will.

You may also interrupt a replay by typing B, when you will be placed in Build mode. Entering moves from this point on will allow you to build up a game from the point where you interrupted the replay. This can be quite useful for trying out different lines. You may prefer to save the original game before doing this as the moves added from the point the game was interrupted will destroy all the following original moves.

To see the complete list of moves in the computer's memory at any one time, select option 5.

I hope you find the program useful and fun to use. Who knows, out there somewhere we may have a budding Bobby Fischer who in later years may claim that he owed his success to *MicroComputer Printout*!

PROGRAM LISTING

PROGRAM OUTLINE

60-260	Get move stored in memory.
270-330	Get move from keyboard.
340-400	Test for end of game.
410-610	Handle castling.
620-660	Moving piece from a square.
670-710	Moving piece to a square.
720-820	Handling a Substitution of pieces.
830-840	Board update.
850-880	Queening a pawn.
890-970	Castling.
980-1000	En passant.
1010-1100	Move validation
1120-1240	Message and move-list display
1250-1510	Initialise
1520-1650	Menu
1660-1930	Build, read tape, write tape, replay
1940-2990	Instructions.
3000-3090	Sample game.

MAJOR VARIABLES

B(8,8)	Board positions.
P$(17)	Graphic piece representations.
MV$(150)	Move store.
TM	Total moves.
MT	Total moves so far.
RP	Set to 1 for automatic replay,0 for single-step.
KB	Set to 1 if move coming from keyboard.
V,VV	Value of the piece.
TR,TC	Row and column position of the piece's destination.
FR,FC	Row and column position of the piece's original square.
B$,B1$	Graphics for empty squares.
GI	Set to 1 if game in memory.
E	Set to 1 if error detected.
CS,PS,XP	Castling, en passant and exchange indicators.

The program occupies some 11k. Can be reduced by removing instructions and embedded game. Chessmate has been written for a Commodore PET, but can easily be converted to run on other machines Main points to watch are the graphics symbols used which may be different on your machine.

```
 10 REM*** BOB CHAPPELL 8/7/82 ***
 20 REM*** CHESS MATE ***
 30 GOSUB1260:GOTO1530
 40 FR=0:FC=0:TR=0:TC=0:E=0:CS=0:PS=0:XP=0:A$="":M$=""
 50 IFKB=1GOTO280
 60 REM*** GET MOVE FROM MEMORY***
 70 MT=MT+1:IFJP=1ANDMT>JMTHENJP=0:RP=0:GOSUB1390:GOSUB1490
 80 GET#3:IFA$="S"ANDRP=1THENRP=0:GOTO80
 90 IFA$="S"GOTO250:REM*** SINGLE-STEP
100 IFA$="A"THENRP=1:REM*** AUTO-STEP
110 IFA$="B"THENTM=MT-1:KB=1:TL$="BUILD":GOSUB1420:GOTO40:REM*** BUILD
120 IFA$="M"THEN1530:REM*** ABANDON
130 IFA$<>"J"GOTO240
140 M$="J":GOSUB1130:L=0:REM*** JUMP
150 GET#3:IFA$=""GOTO150
160 IFA$="#"THENM$="":GOSUB1130:RP=0:GOTO80
170 IFA$=CHR$(13)GOTO200
180 M$=M$+A$:L=L+1:IFL<5THENGOSUB1130
190 GOTO150
200 JM=VAL(MID$(M$,2)):IFJM<0ORJM>TMTHENGOSUB1150:GOTO140
210 GOSUB1380:PRINTLEFT$(D$,10);TAB(2)"SETTING UP BOARD POSITION";JM
220 JP=1:RP=1:MT=MT-1:IFJM>=MTGOTO40
230 MT=0:GOSUB1450:GOTO40
240 IFRP<>1GOTO80
250 M$=MV$(MT):IFJP=1GOTO350
260 GOSUB1130:GOTO350
270 REM*** GET MOVE FROM KEYBOARD ***
280 M$="":L=0
290 GET#3:IFA$=""GOTO290
300 IFA$="#"THENM$="":GOSUB1130:GOTO280
310 IFA$=CHR$(13)GOTO350
320 M$=M$+A$:L=L+1:IFL<6THENGOSUB1130
330 GOTO290
340 REM*** END OF GAME ***
350 IFM$<>"****"GOTO380
360 M$="END":GOSUB1130:IFKB=0GOTO2970
370 TM=TM+1:MV$(TM)="****":GOTO2970
380 IFLEN(M$)=4THENGOSUB1020:GOTO550
390 IFLEN(M$)<>5GOTO560
400 A$=LEFT$(M$,1):M$=MID$(M$,2)
410 REM*** K=CASTLE ***
420 IFA$="K"THENCS=1:GOTO540
430 REM*** P=EN PASSANT ***
440 IFA$="P"THENPS=1:GOTO540
450 REM*** X=EXCHANGE A PIECE ***
460 IFA$<>"X"GOTO560
470 XP=1:IFLEFT$(M$,1)="B"THENCP=1:GOTO490
480 CP=2:IFLEFT$(M$,1)<>"W"ANDLEFT$(M$,1)<>"E"GOTO560
490 TC=ASC(MID$(M$,3,1))-64
500 TR=9-(ASC(MID$(M$,4,1))-48)
510 IFTR<1ORTR>8ORTC<1ORTC>8GOTO560
520 GOSUB730:IFE=1THENGOSUB1150:GOTO40
530 M$=A$+M$:GOTO580
540 GOSUB1020:M$=A$+M$
550 IFE<>1GOTO570
560 GOSUB1150:GOTO40
570 V=B(FR,FC):GOSUB630:GOSUB840
580 IFKB=1GOTO610
590 IFJP=0THENGOSUB1200
600 GOTO40
610 TM=TM+1:MV$(TM)=M$:MT=TM:GOSUB1200:GOTO40
620 REM*** FROM MOVE ***
630 IFJP=1THENRETURN
640 B$="■■■■■■■■":N1=FR/2:N2=FC/2:IFFNA(0)THENB$="  ■■■  ■■■  "
650 FORJ=1TO5:PRINTLEFT$(D$,FR*3-2)TAB(FC*4-2)P$(V):FORJ1=1TO50:NEXT
660 PRINTLEFT$(D$,FR*3-2)TAB(FC*4-2)B$:FORJ1=1TO50:NEXTJ1,J
670 REM*** TO MOVE ***
680 IFJP=1THENRETURN
690 B$="■■■■■■■■":N1=TR/2:N2=TC/2:IFFNA(0)THENB$="  ■■■  ■■■  "
700 FORJ=1TO6:PRINTLEFT$(D$,TR*3-2)TAB(TC*4-2)B$:FORJ1=1TO100:NEXT
710 PRINTLEFT$(D$,TR*3-2)TAB(TC*4-2)P$(V):FORJ1=1TO50:NEXTJ1,J:RETURN
720 REM*** EXCHANGE A PIECE ***
730 C$=MID$(M$,2,1):VV=10:IFCP=2THENVV=0
740 IFC$="Q"THENV=5:GOTO820
750 IFC$="R"THENV=4:GOTO820
760 IFC$="B"THENV=3:GOTO820
770 IFC$="N"THENV=2:GOTO820
780 IFC$="P"THENV=7:GOTO820
790 IFC$="K"THENV=6:GOTO820
800 IFC$="E"THENV=0:VV=0:GOTO820
810 E=1:RETURN
820 V=V+VV:B(TR,TC)=V:GOSUB680:RETURN
830 REM*** UPDATE BOARD ***
840 B(TR,TC)=B(FR,FC):B(FR,FC)=0
850 REM*** QUEEN A PAWN ***
860 IFB(TR,TC)=17ANDTR=8THENB(TR,TC)=15:V=15:GOSUB680:GOTO880
870 IFB(TR,TC)=7ANDTR=1THENB(TR,TC)=5:V=5:GOSUB680:GOTO880
880 IFCS=0GOTO970
890 REM*** WHITE CASTLES QUEEN SIDE ***
900 V=4:IFFR=8ANDTC=3THENTR=8:TC=4:B(8,4)=4:B(8,1)=0:FC=1:GOSUB630:RETURN
910 REM*** WHITE CASTLES KING SIDE ***
920 IFFR=8ANDTC=7THENTR=8:TC=6:B(8,6)=4:B(8,8)=0:FC=8:GOSUB630:RETURN
930 REM*** BLACK CASTLES QUEEN SIDE ***
940 V=14:IFFR=1ANDTC=3THENTR=1:TC=4:B(1,4)=14:B(1,1)=0:FC=1:GOSUB630:RETUR
950 REM*** BLACK CASTLES KING SIDE ***
960 IFFR=1ANDTC=7THENTR=1:TC=6:B(1,6)=14:B(1,8)=0:FC=8:GOSUB630:RETURN
970 IFPS=0THENRETURN
980 REM*** EN PASSANT ***
990 V=1:TR=FR
1000 B(TR,TC)=0:GOSUB680:RETURN
1010 REM*** VALIDATE MOVE ***
1020 FC=ASC(LEFT$(M$,1))-64
1030 FR=9-(ASC(MID$(M$,2,1))-48)
1040 TC=ASC(MID$(M$,3,1))-64
1050 TR=9-(ASC(MID$(M$,4,1))-48)
1060 IFFR<1ORFR>8THENE=1
```

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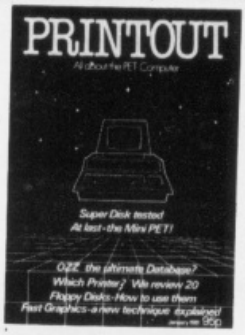
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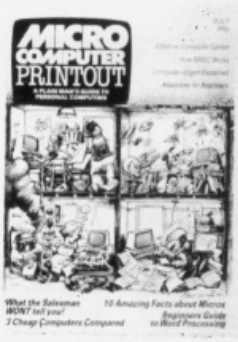

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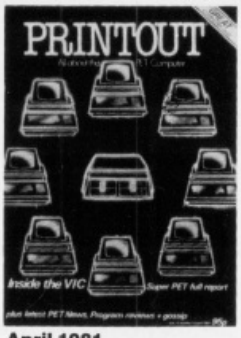

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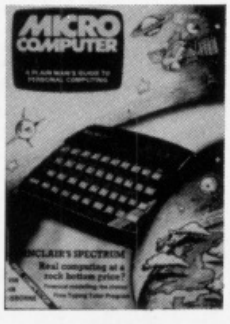

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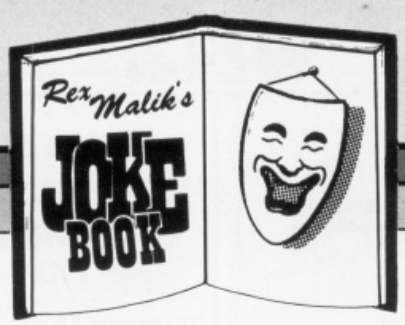
CHESSMATE

(Editor's Note: Bob Chappell has offered to make available recorded copies of Chessmate or any other of his excellent programs for a charge of £5 (cassette) or £8 (disk). Any interested readers should write to him at: Newland Toft, South Green, Mattishall, Norfolk. NR20 3JY).

```
1070 IFFC<10RFC>8THENE=1
1080 IFTR<10RTR>8THENE=1
1090 IFTC<10RTC>8THENE=1
1100 IFFR=TRANDFC=TCTHENE=1
1110 RETURN
1120 REM*** MESSAGE DISPLAY ***
1130 PRINTLEFT$(D$,22);TAB(34);"      "
1140 PRINTLEFT$(D$,22);TAB(34);"■";M$;"■":RETURN
1150 PRINTLEFT$(D$,23);TAB(34);"■ERROR":GOSUB1180
1160 PRINTLEFT$(D$,23);TAB(34);"      "
1170 PRINTLEFT$(D$,22);TAB(34);"      ":RETURN
1180 FORJ=1TO1000:NEXT:RETURN
1190 REM*** LIST DISPLAY ***
1200 PRINTLEFT$(D$,22);TAB(34);"      "
1210 IFMT>1760TO1230
1220 FORJ=1TOMT:PRINTLEFT$(D$,J+4);:TAB(34);MV$(J):NEXT:RETURN
1230 K=5:FORJ=MT-16TOMT:PRINTLEFT$(D$,K);:TAB(34);"      "
1240 PRINTLEFT$(D$,K);:TAB(34);MV$(J):K=K+1:NEXT:RETURN
1250 REM*** INITIALISE ***
1260 DEFFNA(X)=N1=INT(N1)ANDN2<>INT(N2)ORN1<>INT(N1)ANDN2=INT(N2)
1270 D$="■■■■■■■■■■■■■■■■■■■■■■■■■":X=RND(-TI)
1280 DIMB(8,8),P$(17),MV$(150)
1290 P$(0)=""
1300 P$(2)="■■■■■■■■■■■■■■■■■■■
```



As everybody knows, senior managements generally are technologically illiterate. As everybody also knows senior managements do not read. And, whatever they do, their attention span is limited. It was recorded in a famous management textbook of the sixties that the average length of time a senior manager will spend on his own in any one day, uninterrupted by the telephone, is twenty three minutes – and that is to answer the mail.

It is part of the skill of senior management to recognise a good idea when it finally sees one, and act on it. But, naturally enough, not all ideas are good ideas, and sometimes when they are technology based, senior management cannot really tell the difference between a good idea and any old idea, and acts on the second. Which led to one bruised DP manager to come up with "The History of a Typical Project".

1) Conference with cocktails
2) Uncritical acceptance of everything
3) Wild enthusiasm and unlimited expenses
4) Seeds of doubt
5) Disillusionment
6) Total confusion
7) Search for a scapegoat
8) Presentation of specification
9) Punishment of the innocent
10) Agreement of terms of reference
11) Promotion of the non participants
12) Maintenance by the conscientious
13) Proposals for radical restructuring

At which point no doubt one goes back to the start and begins again. All of which – also no doubt – accounts for that basic law of system's creation: "It costs more and it takes longer".

The Japanese seldom make computerjokes. Indeed there are few such jokes outside the USA, the UK and France. Almost everybody else, it seems, lacks our sense of humour. Except.... what follows is the only genuine Russian computer joke I know. I can vouch for its genuineness: it was told to me by that pillar of the Russian computing establishment, Academician Dorodnycin, over dinner back in 1968, when he was in charge of Russian computing's external relations and responsible for negotiating Russia's computing technology exchange agreements.

The Cybernetics Research Institute in Moscow after many years of research and development came up with a cybernetic weighing machine. It was the ultimate in machines: it not only spoke your weight, it did so in your own language, even without you uttering a word. And what is more it also gave you dieting instructions.

The Institute's scientists decided that the best place in which to do their development trials was Moscow International Airport. The machine was taken out there, and installed in the hall just outside 'Arrivals', while the scientists went up the the gallery above to observe.

The Arrivals Hall is large and marble floored. Find a marble floor in a public place in Russia, and you will find a *babushka*, an old lady with mop and rags permanently cleaning. The job is like painting the Forth Bridge, it never stops.

A plane landed, and eventually the passengers started to trickle out. The first to spot the machine was a plump Italian lady. She went and stood on it, there was a two second pause, and then the machine spoke in beautiful and clear Italian. "Your weight", it said, "is seventy two kilos. This is four to six kilos above what you should be for your size and frame. I suggest that you knock off the pasta"

The Italian lady was quickly followed by a Frenchwoman. The machine was much kinder to her. Again there was a two second pause, and then the machine spoke in a flawless Parisian accent. "Your weight is exactly what it should be for your size and frame", it said. "I suggest that whatever it is that you are doing, you should continue".

The *babushka* had been observing this out of the corner of her eye. The hall cleared, and, being unaware of the scientists in the gallery, the *babushka* after taking a careful look around to see that she was not observed, went and stood on the weighing platform.

The two second pause came and went. It stretched out to a five second pause. And then a ten second pause. The machine was pondering. And then it spoke, fluently and plaintively in Russian. And said, "Would one of you please get off?"

Finally we come to FLOG (1). I found this on the administrative office door of the computer centre of the International Institute for Applied Systems Analysis just outside Vienna earlier this year. They are UNIX users, which figures as this is a UNIX joke. It needs to be read slowly, savoured, and then read again. It is one of those jokes which slowly creeps up on you.

NAME

flog – speed up a process

SYNOPSIS

flog [–1n] [–am] [–u] process-id...

DESCRIPTION

Flog is used to stimulate an improvement in the performance of a process that is already in execution.

The *process-id* is the process number of the process that is to be disciplined.

The value *m* of the 1 keyletter argument is the flagellation constant, i.e., the number of *lashes* to be administered per minute. If this argument is omitted, the default is 17, which is the most random 'random' number.

The presence of the 'u' keyletter argument indicates that *flog* is to be *unmerciful* in its actions. This nullifies the effects of the other keyletter arguments. It is recommended that this option be used only on extremely stubborn processes, as its over-use may have detrimental effects.

FILES

Flog will read the file */have/mercy* for any entry containing the process-id of the process being speeded-up. The file can contain whatever supplications are deemed necessary, but, of course, these will be totally ignored if the 'u' keyletter argument is supplied

SEE ALSO

On Improving Process Performance by the Administration of Corrective Stimulation, CACM, vol.4, 1657, pp.356-654.

DIAGNOSTICS

If a named process does not exist, *flog* replies, "flog you" on the standard output. If *flog kill* (ll)s the process, which usually happens when the 'u' keyletter argument is supplied, it writes "rip," followed by the process-id of the deceased, on the standard output.

BUGS

Spurious supplications for mercy by the process being flogged sometimes wind up on the standard output, rather than in */shut/up*.

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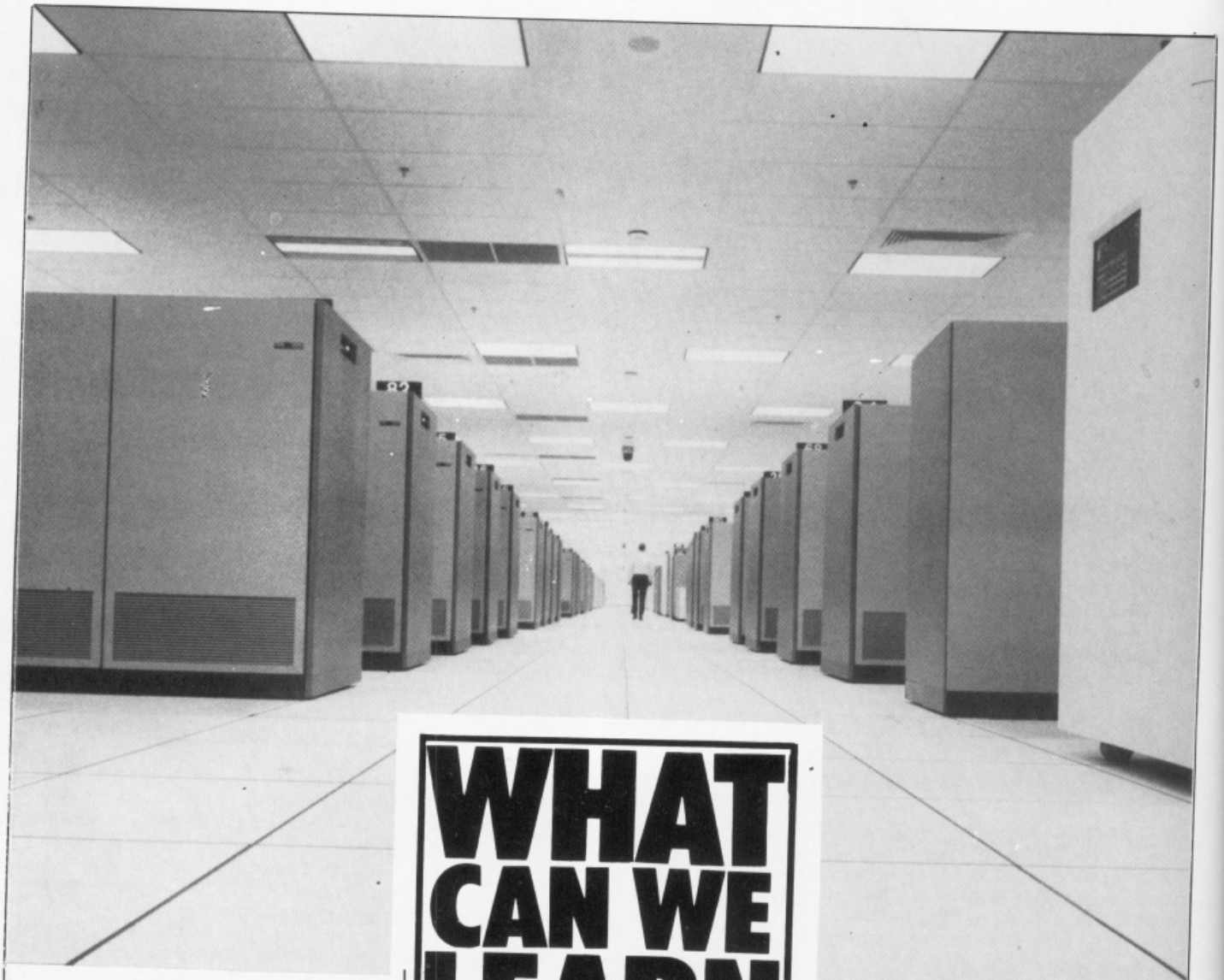
Crossword Answers

ACROSS

1. Pawson .
4 & 5 down. Uncle Clive
8. Commodore
9. Inset
10. Merge
11. Stellar
13. Roe
15 & 18 across. User friendly
16. Commands
20 & 1 down. Word processor
21. Wet
23. Averred
26. Alice
27. Board
28. Modulator
29. Daisy
30. Parity

DOWN

2 2. Slower
3. Noodle
4. Users
6. Epsilon
7. Returns
12. Temple
14. On edge
16. Coy
17. Directory
18. Flatbed
19. Iceland
21. Wind up
22. Tailor
24. Radii
25. Dumpy



WHAT CAN WE LEARN FROM DP?

The microcomputer industry is still a fairly young one; less than 10 years old. The personal computer boom which is now enjoying such publicity is younger still, being started to all intents and purposes by the launching of the Apple and PET in the late 70's. With the introduction of *really* useful microcomputers (mentioning no names of course!), it is now patently obvious that there is a lot of money to be made in microcomputers, not just for a few large firms such as Commodore or Microsoft, but for small British firms as well. This has meant that a large number of people have been attracted to the industry, in the hope of making their fortunes. Most of these were existing, well-qualified computer experts from minicomputer and mainframe installations. Unfortunately there were (and still are) plenty of sharks, either incompetent or just plain negligent, and some of these people gave the infant some very bad publicity.

On the other hand however, there are a large number of newcomers to computing who, attracted by the low cost of a personal computer, have bought one either for their own interest (or their children's!) or to help them run their businesses, and have taught themselves how to program the machine from scratch. It is to these people in particular, but also to everyone connected with microcomputers, that this article is addressed. The problem is that many microcomputer people seem obsessed with reinventing not only the wheel, but also all the skills and techniques which have been built up over the past thirty odd years by many thousands of often brilliant research staff in universities and manufactuers' R & D departments world-wide. The purpose of this article is to point out some ways in which microcomputers products, both hardware and software, fall down, and to try to encourage people to use

information which is readily available in trade journals and public libraries. Some of the comments are obviously aimed at manufacturers and retailers, but customers should read these as well, because they can then check up that their suppliers are giving the service they should.

Lurid Covers

Too many people, professional and hobbyist, seem to be afraid to use the many excellent textbooks and periodicals on computing in bookshops and libraries. While glossy paperbacks with lurid covers entitled "Better BASIC for your BLIMP", and "Learn how to program the CRIMP in assembly language" may be fine as introductions to computing, remember the quotation from The Merchant of Venice: "all that glitters is not gold". If you move from the "Microcomputer" shelf in the bookshop to the general "Computing" you will find many books in plain covers which will give you a lot of information on things such as structured programming, algorithms and so on, which are not as difficult to understand as you might think. Of course a bit of thought is required, but honestly it is worth it.

If you think you can get by just learning a language without any of the other techniques, remember the story about the proverbial nine-stone weakling who bought a Charles Atlas bodybuilding course to build up his muscles. However he couldn't afford the whole course, so he just bought the chest and arms section. Inside 6 months he had 18 inch biceps and a 44 inch chest, in fact he looked just like the Editor does in that funny mirror he keeps behind the filing cabinet. The trouble was that the still had his skinny little legs, and one day he was running for the bus and they both collapsed! (Pause for laughter to die down). The point of the story is that if you should aim for an all-round knowledge. If you build up just one side of your computer expertise, you are really missing out.

Program Planning

But there is more to programming than learning difficult algorithms and keeping up with the latest mathematical methods. Many people just have an idea for a program, say a diary program, and then sit in front of a computer and key in the first thing which comes into their heads. However, if you are intending to write serious programs, even if purely for your own use, you cannot go about it like this. You must first of all *plan* what the program is going to do, how it is going to do it, what information it is going to need, what output it is going to produce, and so on. Draw up flowcharts, file and record layouts, screen and printer layouts. When you start to write the program, make sure it is well documented. If you are writing in a structured language (which to my mind includes assembler) there is no excuse for explaining in the program text what each variable, program segment and subroutine does. If you have been programming for a while you will build up a library of routines which you use a lot. Put them on a separate "library" disk where they can be copied into your new program as required, and document them. Make out a chart for each subroutine saying what it does, what input it needs and what output it produces, what variables are used, and if written in assembler, which registers and flags are affected. If the workings of the routine are particularly complicated, make a note of how it works, because you can bet your shirt that when you come back in a year's time to use the routine in another program, you will have forgotten how it works!

If you build up just one side of your computer expertise, you are really missing out!

"Big computers are Bad computers" – this statement is typical of the attitude of many suppliers and users of Microcomputers. But the mainframe industry has been established for nearly three decades, and has learnt many lessons which the Microboys are only just discovering. Chris Preston maintains that we ignore their experience at our peril

This is not really the place to go into structured and modular programming techniques, except to say that they are very useful. However with so many micros now having chaining commands of one sort or another, and those which don't being well supplied with patches to allow chaining, there is no excuse for mammoth programs, which should really be split down into manageable chunks. Apart from making the programs easier to test and update, small BASIC programs run much faster than large ones, because of the way interpretive BASIC works. How many people write special programs to test their programs? In general, minicomputer and mainframe installations have a much more rigid attitude to testing than micro people. Programs are written in small blocks, each of which is rigorously tested by specially-written test programs before being connected to other blocks to make up the full program. Special test data is produced to test the program, in three stages. First, special test data is produced to allow the programmer to get the program to work at all. Secondly data is produced which will concentrate on parts of the program which are considered "risky", such as the part of the program which closes a file when it is full and opens the next, and exercises all the error-testing parts of the program. Lastly random data is produced which gives the final test to the program before it is given a clean bill of health.

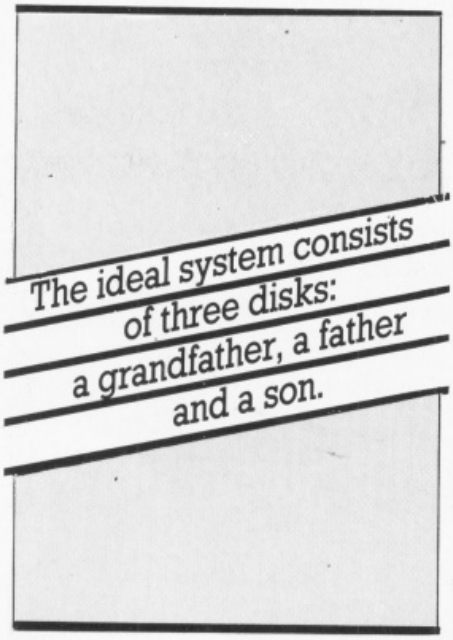
Customer Support

Especially glaring are the shortcomings in the business sector of the micro industry. Leaving aside such things as poor quality merchandise and rogue

WHAT CAN WE LEARN FROM DP?

dealers who don't support their customers once the cheque has been cashed, there are still many things which the micro industry can learn from its big brothers.

First of all data integrity. There is more to data integrity than telling the customer to copy a disk after changing a file. Disk drives are not perfect, and the way a program operates can dramatically affect the possibility of a data corruption, and also how serious a corruption is, whether it just affects one part of the file or means that the whole database has to be written off. Similarly, there is more to backing up disks than copying a disk whenever it is written to. The ideal system for an on-line computer application consists of three disks: a grandfather, a father and a son, which are used in rotation. Two disks



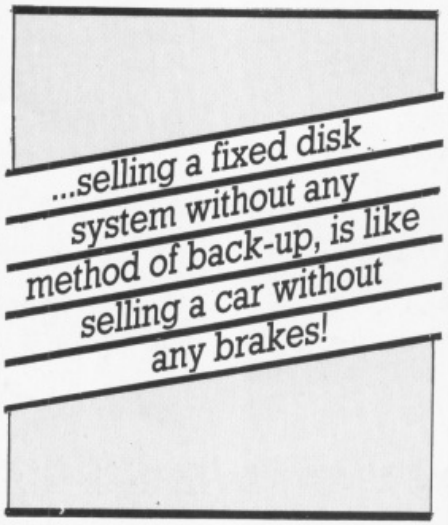
alone are not enough, because Sod's law says that the disk will get corrupted just before you copy it, so you now have two useless disks! In addition, if you are running a monthly system, say a ledger or payroll, you should have archives from before the previous "month end " procedure. For a batch processing application a possible backup system is just to keep a copy of last months master file, together with all the transaction files. If your current master file becomes corrupt, you can recreate it by running the transaction files against the master file. The recreation process may be slow, but there is no time wasted in backing up a large master file at the end of each day's processing.

Talking about backing up, I think that selling a fixed hard disk system without any method of backup is like selling a car without brakes, and backing up 20 MB of hard disk onto a series of floppy disks is no system worth talking about. A fast tape system does not cost too much, and may save a disaster.

Audit Trail

One item often neglected on micro business systems is the audit trail. A *meaningful* audit trail is an invaluable aid when you need to trace a payment to Floggit & Run Ltd. and the VAT man is sitting at the other end of the office with that disbelieving look they seem to cultivate. Businesses should not complain about the cost of paper; again think of a car without brakes.

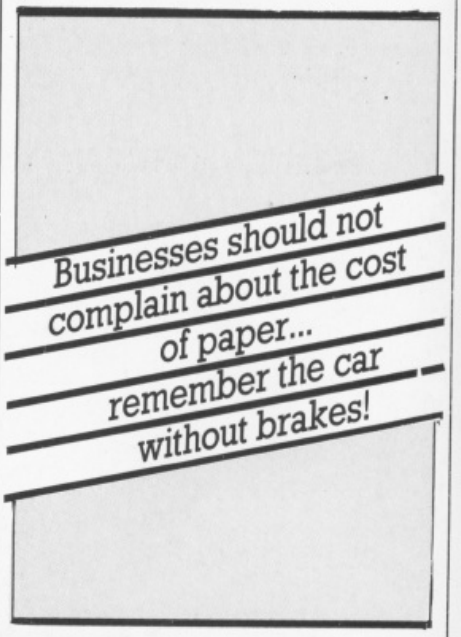
Another way in which the micro industry could learn from the mini market is in the question of customer relations, which does not man going out with all the dishiest customers for meals in expensive restaurants. It means spending time with the customer finding out *exactly* what he needs, and explaining how you intend to provide it. It means educating him, if he is a newcomer to computing, into all the little tricks which make an installation run smoothly, such as not pouring coffee into the keyboard, always putting diskettes back into the envelopes, keeping proper records of all the operations of the installation, cleaning disk head, and *taking backups*. The business of backups is too often skated over by salesmen who are obviously keen to stress the reliability of their equipment, but it is a good motto



always to expect that the worst will occur. Apart from anything else, what does happen cannot be as bad as your imaginings!

Customer relations means making sure that more than one person at the customer site knows how to work the machine, because if only one person can, you can bet your life that they will be off sick or out of the office when there is an emergency and then who is going to get a frantic phone call??? Finally, customer relations means taking care of the customer once he has bought the product, been trained how to use it, and got on to work with it. He is bound to have problems: problems of understanding, wanting to do things which maybe cannot be handled by the current version (in which case you want to make a note so that the next release can cope with it), and even (heaven forbid) breakdowns and bugs.

I can see in my mind's eye thousands of retailers throwing up their hands in disgust. "We can't do all that – we need all our profit margin to pay for the after-sales support". The point is that the more pre-installation support you give, the less you will need to allocate for after-installation support. Also, the more



support you can give the customer the more likely he is to come to you for more equipment in the future. An aside for customers though: Please don't waste peoples time. If you have a query, get all your facts straight before phoning for help. Are you sure it isn't in the manual? Phoning your supplier is like phoning the police: they are there to help, but if you phone for no good reason and waste their time, you will not be welcome. □

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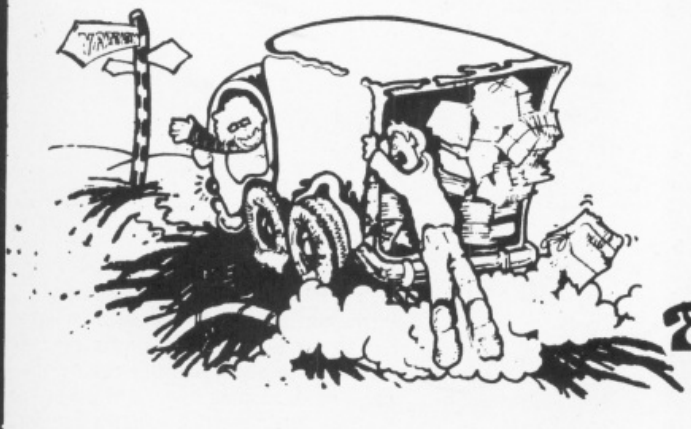

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INSIDE TRADER

A call from my old friend, the Lord Chamberlain. Who amongst micro persons should receive a gong in the New Year's honours? Sir Chris Curry has a certain ring to it, I muse. Alas, it seems Her Majesty was not amused by her five month wait for a BBC machine. So 'Arise Sir Clive' it is then.

I eagerly await IPCs forthcoming seminar on Micro Mortality. Contributions include Clive Sinclair on Self-Effacement, *Martin 'Legless' Banks on* Sobriety, *Jon 'Little Genius' Baldachin on* Modesty, *and David 'Exocet' Low on the subsject of* Tact. *I had also looked forward to hearing Guy Kewney on* How to Win Friends and Influence People, but it seems he has a prior engagement.

Jon Baldachin

Martin 'Legless' Banks

The estate of the late Charlie Chaplin were unamused to discover that IBM were using the little tramp to advertise their personal computer. The company have apologised, explaining that Micky Mouse had been unavailable.

The days of the respectful error message may be over. As his contribution to humanity, Jeff Shrager of Carnegie-Mellon University has developed a program that is made for you. This A.I routine lucks unseen in the operating system until the aprogrammer makes a bog of things. "Then it is really *obnoxious," he explains helpfully.*

I am happy to give the lie to the mischievous suggestions that Commodore's 8000 series PET is absolete and unsuitable. Whjy only this week I encountered an 8032 application at the very forefront of technology: Lavatories at Reckitt & Coleman's Stonefeng laboratory are flushed by a CBM 8032.

Another beezer wheeze from the innovative Desperate Dave Tebbutt. The essence of this imaginative scheme is that his Caxtron Software company will give *programs away free. "It could be a real money-spinner" he enthuses.*

Determined to avoid a Koo Stark-style situation, ACT stipulated that the acress in their Sirius TV commercial should never have modelled nude. Chairman Lindsay Bury's reaction to the lovely Toni White's subsequent appearance on page 3 of the *Sun* is not recorded.

I congratulate Commodore's body building commandant, Bob Gleadow on the successful implementation of his new management strategy, 'Dynamic Tension'. So dynamic is the tension now at Chateau Commodore that half the senior management are seeking alternative employment.

Hope of a gastronomic adventure as the guest of Atari's gourmet new M.D. are dashed by a succession of unappetising dishes. Raising the matter with a functionary I am told "Too right, squire. I bring sandwiches and I'm the chef".

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